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WOODCRAFT[®]

Projects, Techniques, and Products *magazine*

Complete Shop Guide *p.18*

All you need
to get started
today

16 TIPS
and JIGS

8 EASY PROJECTS

- Rock-Solid Workbench
- Hand-Tool Wall Cabinet
- Miter Saw Station
- Benchtop Router Table
- 3 Mobile Carts
- Modular Tool Bins

PLUS...

- 10 Cool Products For A Better Shop

VOL. 11/NO. 66 AUG/SEPT 15

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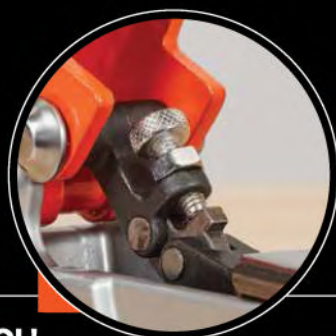
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- Arbor: ¾"
- Arbor speed: 4000 RPM
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- Rip capacity: 30" R, 12" L
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FREE 10" CARBIDE-TIPPED BLADE

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10" HYBRID TABLE SAW with RIVING KNIFE

- Motor: 2 HP, 110V/220V, single-phase, prewired to 220V, 16A/8A
- Precision-ground cast iron table with wing: 27" x 40"
- Arbor: ¾"
- Arbor speed: 3850 RPM
- Capacity: 3½" @ 90°, 2½" @ 45°
- Rip capacity: 30" R, 12" L
- Approx. shipping weight: 416 lbs.



FREE 10" CARBIDE-TIPPED BLADE

G0715P ONLY \$825⁰⁰

10" 3 HP CABINET LEFT-TILTING TABLE SAW

- Motor: 3 HP, 240V, single-phase, 14A, 3450 RPM
- Precision table with cast iron table size (with 2 solid extension wings attached): 40" W x 27" D
- Capacity: 3" @ 90°, 2½" @ 45°
- Rip capacity: 26" R, 8" L
- Base dimension: 20½" x 20½"
- Approximate shipping weight: 508 lbs.



FREE 10" CARBIDE-TIPPED BLADE

G1023RL ONLY \$1325⁰⁰

10" CABINET TABLE SAW with RIVING KNIFE

- Motor: 3 HP, 220V, single-phase, 12.8A
- Precision-ground cast iron table with extension: 27" x 40"
- Table height: 34"
- Arbor: ¾"
- Arbor speed: 4300 RPM
- Max. dado width: 1½"
- Capacity @ 90°: 3½", @ 45°: 2½"
- Rip capacity: 29½" R, 12" L
- Approx. shipping weight: 530 lbs.



FREE 10" CARBIDE-TIPPED BLADE

G0690 ONLY \$1495⁰⁰

10" LEFT-TILTING TABLE SAW with RIVING KNIFE, 7' RAILS & EXTENSION TABLE

- Motor: 3 HP, 240V, single-phase, 3450 RPM, 14A
- Cutting capacity: 8" L, 53" R of blade
- Max. depth of cut @ 90°: 3"
- Max. depth of cut @ 45°: 2½"
- Extension table: 44" W x 27" D
- Base dimension: 20½" x 20½"
- Approximate shipping weight: 550 lbs.



FREE 10" CARBIDE-TIPPED BLADE

G1023RLX ONLY \$1575⁰⁰

10" CABINET TABLE SAW with RIVING KNIFE & EXTENSION RAILS

- Motor: 3 HP, 220V, single-phase, 12.8A
- Blade tilt: Left, 45° • Arbor speed: 4300 RPM
- Arbor size: ¾" • Max. dado width: 1½"
- Max. depth of cut: 3½" @ 90°, 2½" @ 45°
- Max. rip capacity: 50"
- Dist. from front of table to blade at maximum cut: 12¼"
- Dist. from front of table to center of blade: 17¼"
- Approx. shipping weight: 557 lbs.



FREE 10" CARBIDE-TIPPED BLADE

G0691 ONLY \$1595⁰⁰

8" JOINTERS

- Motor: 3 HP, 240V, single-phase, TEFC, 3450 RPM, 15A
- Precision-ground cast iron table size: 9" x 72½"
- Cutterhead speed: 4800 RPM
- Cutterhead diameter: 3"
- Max. depth of cut: 1/8"
- Max. rabbeting depth: 1/2"
- Cuts per minute: 20,000 (G0656P), 21,400 (G0656PX)
- Approximate shipping weight: 500 lbs.



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4 KNIFE CUTTERHEAD

G0656P ONLY \$825⁰⁰

SPIRAL CUTTERHEAD

G0656PX ONLY \$1250⁰⁰

12" JOINTER/PLANER with SPIRAL CUTTERHEAD

- Motor: 5 HP, 220V, single-phase, 25A
- Jointer table size: 14" x 59½"
- Cutterhead dia.: 3½"
- Cutterhead speed: 5034 RPM
- Max. jointer depth of cut: 1/8"
- Max. width of cut: 12"
- Planer feed rate: 22 FPM
- Max. planer depth of cut: 1/8"
- Max. planer cutting height: 8"
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- Motor: 3 HP, 240V, single-phase, 15A
- Precision-ground cast iron table size: 15" x 20"
- Min. stock thickness: 3/16"
- Min. stock length: 8"
- Max. cutting depth: 1/8"
- Feed rate: 16 & 30 FPM
- Cutterhead dia.: 3", speed: 4800 RPM
- Approx. shipping weight: 675 lbs.



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CAST IRON
BED AND
INFEED &
OUTFEED
TABLES



3 KNIFE CUTTERHEAD

G0453P ONLY \$1150⁰⁰

SPIRAL CUTTERHEAD

G0453PX ONLY \$1795⁰⁰

20" PLANERS

- Motor: 5 HP, 240V, single-phase, 19A
- Precision-ground cast iron table size: 20" x 25 3/4" (20" x 55 1/2" with extension)
- Max. cutting width: 20"
- Min. stock length: 8"
- Max. cutting depth: 1/8"
- Feed rate: 16 & 20 FPM
- Cutterhead dia.: 3 1/2", speed: 4800 RPM
- Approx. shipping weight: 932 lbs.



4 KNIFE CUTTERHEAD

G0454 ONLY \$1750⁰⁰

SPIRAL CUTTERHEAD

G0454Z ONLY \$2575⁰⁰



3 HP SHAPER

- Motor: 3 HP, 240V, single-phase, with reversing switch, 12A
- Precision-ground cast iron table with standard wing attached: 30 1/2" x 28 1/4"
- Floor-to-table height: 34"
- Spindle travel: 3"
- 3 Interchangeable spindles: 1/2", 3/4", and 1"
- Spindle openings on table: 1 1/4", 3", 4", and 7"
- Spindle speeds: 7000 and 10,000 RPM
- Approximate shipping weight: 392 lbs.



G1026 \$1195⁰⁰ SALE \$1150⁰⁰

12 SPEED HEAVY-DUTY 14" FLOOR DRILL PRESS

- Motor: 3/4 HP, 110V, single-phase • Swing: 14"
- Drill chuck: 1/4"-5/8"
- Drilling capacity: 3/4" steel
- Spindle taper: MT#2 • Spindle travel: 3 1/4"
- Speeds: 140, 260, 320, 380, 480, 540, 980, 1160, 1510, 1650, 2180, 3050 RPM • Collar size: 2.595"
- Precision-ground cast iron table size: 11 1/2" square
- Table swing: 360°
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- Overall height: 64"
- Approx. shipping weight: 171 lbs.

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- Motor: 2 HP, 240V, single-phase, 3450 RPM, 9A
- 6" inlet w/ removable "Y" fitting with two 4" openings
- Impeller: 12 1/2" aluminum
- Portable base size: 21 1/4" x 33 1/2"
- Bag volume: 5.7 cubic feet
- Height (with bags inflated): 78"
- Bag size: 19 1/2" x 33" (2)
- Air suction cap.: 1550 CFM
- Maximum static pressure: 11"
- Standard bag filtration: 2.5 Micron
- Approx. shipping weight: 122 lbs.



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- Air suction capacity: 775 CFM
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- Impeller: 13 1/2"
- Height: 68"
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ULTIMATE 14" BANDSAW

- Motor: 1 HP, 110V/220V, single-phase, TEFC, 11A/5.5A
- Precision-ground cast iron table size: 14" sq.
- Table tilt: 45° R, 15° L
• Cutting capacity/throat: 13 1/2"
- Max. cutting height: 6"
- Blade size: 92 1/2"-93 1/2" L (1 1/8"-3/4" W)
- Blade speeds: 1500 & 3200 FPM
- Approx. shipping weight: 196 lbs.



G0555P ONLY \$545⁰⁰

30TH ANNIVERSARY 17" HEAVY-DUTY BANDSAW

- Motor: 2 HP, 110V/220V, single-phase, TEFC, prewired 220V, 1725 RPM
- Amps: 20A at 110V, 10A at 220V
- Precision-ground cast iron table size: 17" x 17" x 1 1/2" thick
- Table tilt: 10° left, 45° right
- Floor-to-table height: 37 1/2"
- Cutting capacity/throat: 16 1/4" left
- Blade size: 131 1/2" long
- Approx. shipping weight: 342 lbs.

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G0513ANV ONLY \$875⁰⁰

17" HEAVY-DUTY BANDSAW

- Motor: 2 HP, 110V/220V, prewired to 220V, single-phase, TEFC
- Precision-ground cast iron table size: 17" sq.
- Table tilt: 45° R, 10° L
- Cutting capacity/throat: 16 1/4"
- Max. cutting height: 12 1/8"
- Blade size: 131 1/2" L (1 1/8"-1" W)
- Blade speeds: 1700 & 3500 FPM
- Quick-release blade tension lever
- Approx. shipping weight: 346 lbs.

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G0513P ONLY \$895⁰⁰

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18 The Up-and-Comer's Home Shop

Looking to build a shop or improve the one you already have? See how to start with a bare-bones space and transform it into an awesome woodworking dream shop, complete with cool projects and products.

28 The Weekend Workbench

Using a purchased laminated 1¾"-thick top and 3 × 3" legs, build a stout woodworker's bench complete with front and end vises, plus shelving.

34 Custom Hand-Tool Cabinet

Keep your go-to hand tools, glues, and hardware in this handy case. Storage includes sliding doors and Peg-Board for hanging items, adjustable shelves, and 11 drawers.

44 Torsion-Beam Mittersaw Station

Whether working indoors or out, this work center delivers, featuring sliding and locking extension tables on a dead-flat beam. Gang the tables together to cut extra-long stock.

52 Compact Router Table

Build a laminated top and a case with an H-shaped understructure that ensures a perfectly flat routing surface. Add to it an accurate fence that clamps to the top.



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60 A Trio of Benchtop Carts

Give your tools mobile homes. Use the shorter 2 x 2' design for the benchtop router table, and the taller 2 x 2' and 2 x 4' carts for a drill press, bandsaw, jointer, and planer.

66 Wall-Mounted Tool Cubby Cabinet

Store portable power tools, books, and other shop items in one of these wall-hung cases. Adjust the cubby sizes by relocating the hardboard dividers in the dado slots.



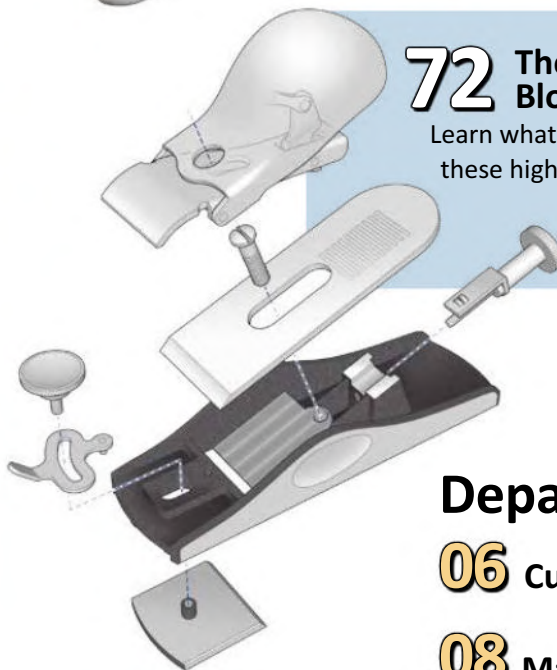
24 10 Home-Shop Improvements

LED ceiling fixtures, a self-retracting cord reel, a sturdy folding stand—these are just a few of the unique products found in this round-up of shop-worthy products.



72 The Essential Block Plane

Learn what to look for in one of these highly valued hand tools, as well as how to use and maintain it.



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08 Mailbox

10 Tips & Tricks



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Safety First! Working wood can be dangerous. Always make shop safety your first priority by reading and following the recommendations of your machine owner's manuals, using appropriate guards and safety devices, and maintaining all your tools properly. Use adequate sight and hearing protection. Please note that for purposes of illustrative clarity, guards and other safety devices may be removed from tools shown in photographs and illustrations in this publication.

Our up-and-comer's journey

Becoming a woodworker doesn't happen overnight. It's a lifelong journey that may begin with a shop class in high school, a summer construction job, or when you buy that first home—a fixer-upper that screams for attention. That was the case with our 38-year-old up-and-comer woodworker Chad McClung whose first real shop is featured on the cover and throughout this special issue. "A couple years before I started at the magazine (Chad is now the art director), I made the mistake of buying a 100-year-old house. The upkeep was a lot of work for a nerd who likes comic books and video games. But over time, I began to (almost) enjoy the hard work and problem solving. My first real foray into woodworking happened soon after I joined *Woodcraft Magazine* as a graphic designer."

It was during these years that Chad's toolbox began to fill. "Via Father's Day gifts, yard sales, and purchases at Woodcraft, I acquired a circular saw, jigsaw, reciprocating saw, and a couple of handheld drills. I quickly realized that the DIY stuff that I had been accustomed to was nowhere near as

technical or interesting as the projects I found in the magazine.

"Suddenly I found myself surrounded by excellent woodworkers whose passion for the craft was contagious. Jim Harrold helped me build my very first woodworking project—a simple cutting board, but hey, ya gotta start somewhere. I soon took classes at the neighboring Woodcraft store. Of course reading the articles in the magazine and having a staff of experienced woodworking editors at my disposal was a huge help. We all need mentors. Access to the magazine shop made it easy for me to start building small Christmas gifts for the family. I really took the plunge when I attended a weeklong woodworking course at the JD Lohr School of Woodworking—what a fantastic experience! I knew then that my future would include having my own shop.

"Then, in 2014, I moved into a newer house that had a roomy two-stall detached garage—an ideal location for a shop. After several months of hard work, here we are. Maybe now I can build a bookshelf for my comic books."

Chad, may your woodworking journey provide you with lifelong enjoyment. And may our readers share in the bounty of projects and ideas found in this special issue.



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Designed with the perfect combination of power and balance with excellent grip for safe, one-handed operation, the Triton Compact Palm Planer **TCMPL** and Palm Belt Sander **TCMBS** deliver all the features of their conventional-sized cousins and more. A compact body shell is ideal for use in confined areas or for intricate projects. Fitted with comfortable over-moulded grips and dust extraction ports for safe clean working, they make light work of most common sanding and smoothing applications.



TCM PL



TCM BS



Unpalatable pallets

I'd like to comment on "Making Good with Salvaged Wood," which appeared in the June/July 2015 issue of *Woodcraft Magazine*. Pallets coming from overseas and those manufactured locally for transmodal/international movement may be treated with preservatives, fungicides, and pesticides. These pallets are industrial-rated items, and as such, have allowances for the use of harsher chemicals.

In fact, even "barn woods" may contain DDT, Diazanone, Malathion, arsenic, and other toxins, especially floorboards. Therefore, airway protection and solid dust management in the shop is essential.

—Kerry Duncan,
Norfolk, Virginia

Kerri, There are some hazardous compounds that soak invisibly into pallet wood and have the potential to cause health issues when liberated during cutting and sanding. In the article, I pointed out that the historical value of salvaged wood can lend a special value to objects made from it, but this history should also be considered with regard to safety.

—Tim Snyder, Deputy Editor

Message in a bottle

I noted with interest your recipe for the magnetic bottle opener. My son sent me a link for a vendor offering less-expensive magnets. When I tried to use them, I discovered that a 1/2" magnet was not strong enough to hold the caps.

I plan to pick up some 1" magnets and try again. Until then, how many caps does your bottle hold?

—Ike Weatherholtz, *Falling Waters*, West Virginia

Ike, the 1" magnets are the secret ingredients in the wood bottle. They're not cheap. Make sure that you bore the recess in the back as deeply as you can without breaking through the front surface of the wood with the Forstner bit's spur. I've held up to 14 caps, but I know the bottle could hold a lot more. I suppose I'll need to drink a case of beer to truly find out. I've had worse assignments.

—Jim Harrold, Editor In Chief



You're all about building things that stand the test of time. So you'll appreciate the left-tilt 10" Cabinet Saw (50-270KDL) with precision ground cast-iron table and the Deluxe Excalibur multi-position rip fence. Custom safety features include quick-release riving-style splitter with quick-remove blade guard and anti-kickback pawls, and stand-alone European style riving knife. Add the easy to install Excalibur Blade Cover that removes sawdust from above, immediately as it comes off the blade. To learn more about our entire line of woodworking tools, visit your nearest dealer or www.general.ca.

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Attractive fix for the plane cabinet

Over the winter I built the "Hand Plane Showcase" from the Dec/Jan 2015 issue. It was my first big woodworking project, and all went well until I started arranging my collection of No. 2 planes. The top-heavy design of the small planes caused gravity to pull them off the ramps. I corrected the problem by installing small rare-earth magnets in counterbores under the planes where they won't show. Now the case hangs proudly on my living room wall.

—Robert Taylor, Viroqua, Wisconsin

Robert, by adding the rare-earth magnets, you not only keep the planes in place, but you can also arrange them perfectly parallel to one another. Thanks for the tip.

—Jim Harrold, Editor In Chief

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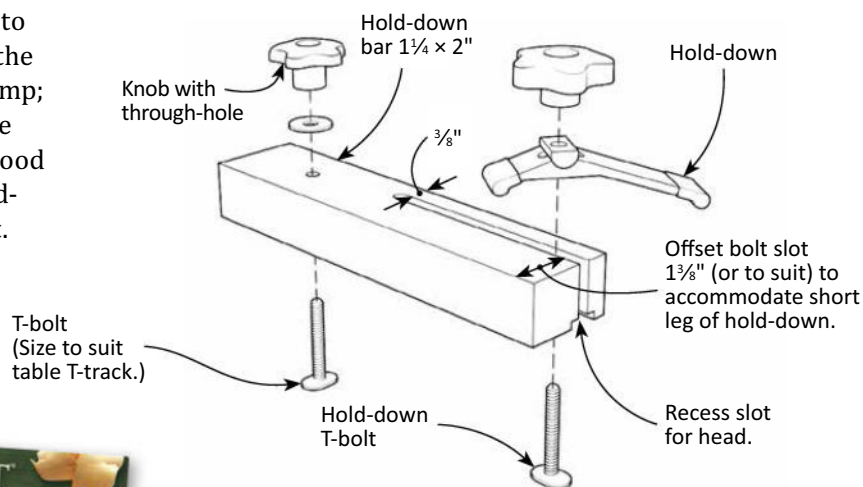
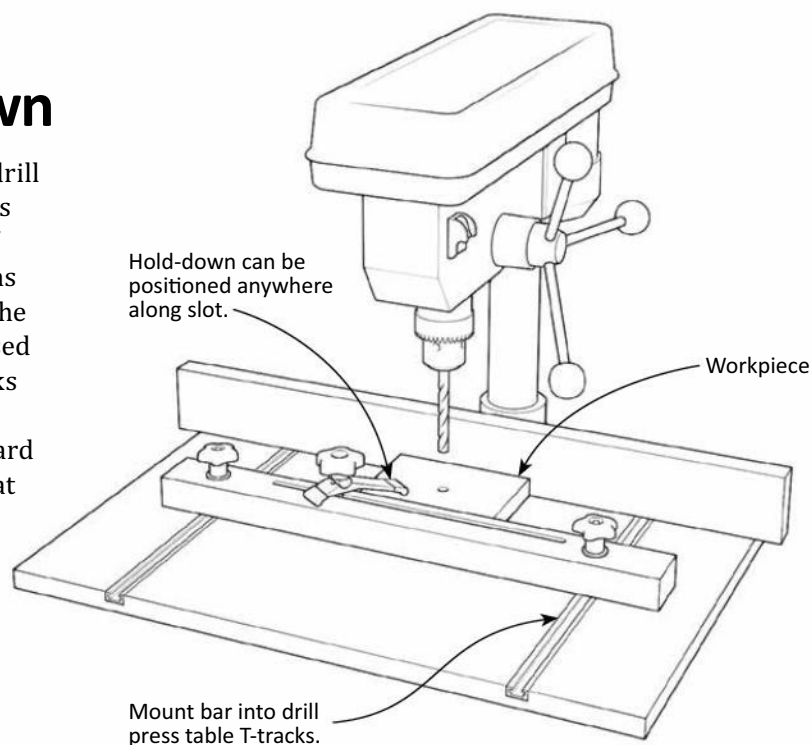
TOP TIP

Drill press hold-down

Like many woodworkers, I outfitted my drill press with an auxiliary table that includes two T-tracks for mounting the fence and/or hold-downs. Unfortunately, hold-downs mounted in the tracks were often out of the reach of small parts. As a solution, I devised this hold-down bar that spans the T-tracks and allows me to position a hold-down at any point with great force. I drilled the hard maple bar to accept T-bolts and knobs that connect it to the table T-tracks. Then I routed a 12"-long through-slot (recessing it on the underside) to connect the hold-down. (I replaced the hold-down's hex head bolt with a T-bolt for smoother sliding operation.)

The unit is simple to make. Just get T-bolts and knobs to fit the size of your table T-tracks, and then rout the slot to suit your chosen hold-down. (I used the Woodpeckers Deluxe Hold-Down Clamp; Woodcraft Item #142603). I offset the slot as shown to allow the short leg good footing, but if you use a different hold-down, simply adjust the offset to suit.

—Vic Danart, Wacissa, Florida



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Here's your chance to help someone become a better woodworker and get rewarded for the effort. The winner of next issue's **Top Tip** award will receive a **Woodcraft Gift Card worth \$250**. All others will receive **\$125** for a published illustrated tip, or **\$75** for

a non-illustrated tip. Published tips become the property of *Woodcraft Magazine*. Send your ideas to:

Tips & Tricks, Woodcraft Magazine, P.O. Box 7020, Parkersburg, WV 26102-7020 or visit **woodcraftmagazine.com**, and click on "Submit Tips." Important: Please include your phone number, as an editor may need to call you if your trick is considered for publication.



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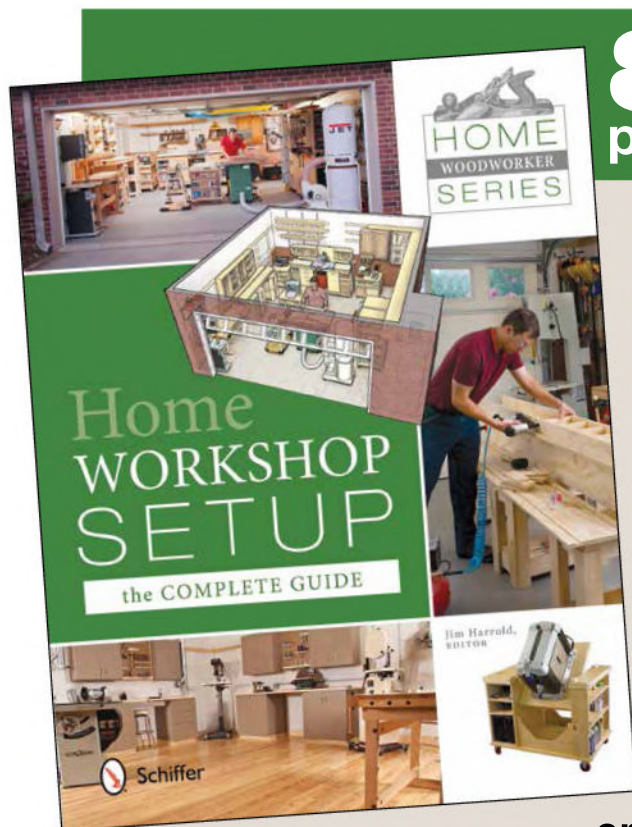
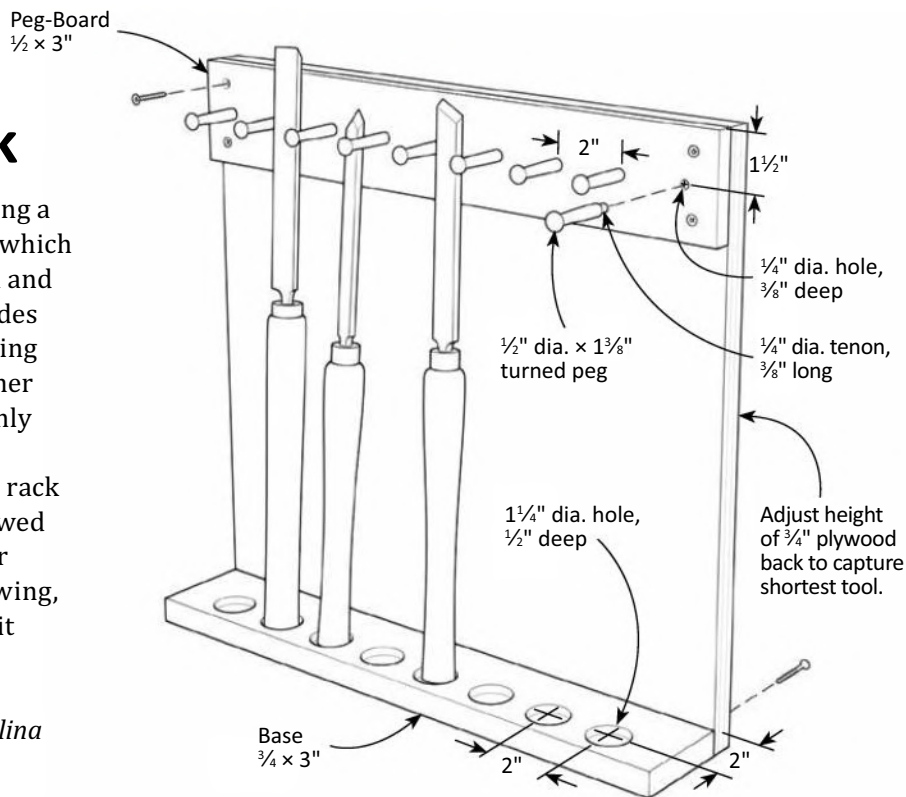
Titebond offers the most comprehensive assortment of glues for bonding wood, including Titebond III Ultimate Wood Glue. For more information on the right glue for your next project, visit titebond.com or call 1.800.347.4583.



Lathe chisel rack

Lathe work typically involves using a fair number of tools in a session, which means they need to be organized and easily accessible. This rack provides those services while also protecting the tools from damaging each other by separating them with commonly available Shaker pegs. One of the beauties of this design is that the rack can stand alone, or it can be screwed to a wall or cabinet top—whatever serves best. As shown in the drawing, it's easy to build in any size to suit your collection, or perhaps just your most commonly used tools.

—Andy Rae, Asheville, North Carolina



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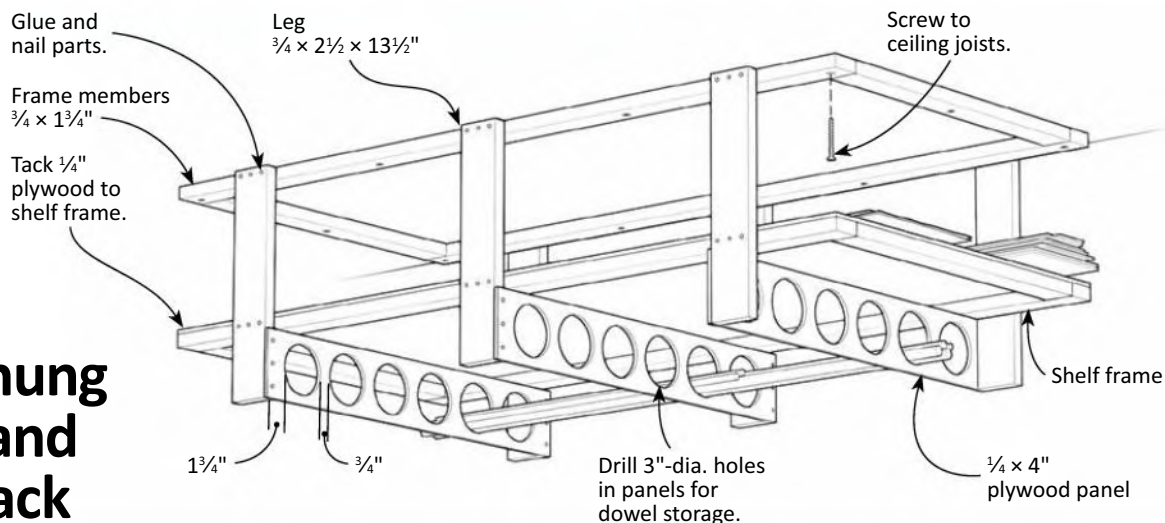
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—Paul Anthony, Senior Editor

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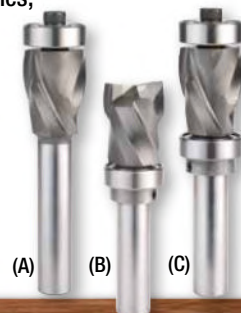


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The Up-and-Comer's

Everything you need for a fully functional workspace

By Jim Harrold with Chad McClung

Every two years at *Woodcraft Magazine*, we create a unique home workshop issue for readers wanting to start a shop or improve the one they already have. We first decide on a theme and then follow

through by selecting a bare-bones space that serves as our blank slate. We then prep the walls, ceiling, and floor for shop duty and outfit the space with original shop projects and interesting products that match

nicely with the theme, which, in this issue, is the "up-and-comer's" home shop. As you can imagine, it's an all-hands effort by our talented staff and woodworking contributors from across the country.

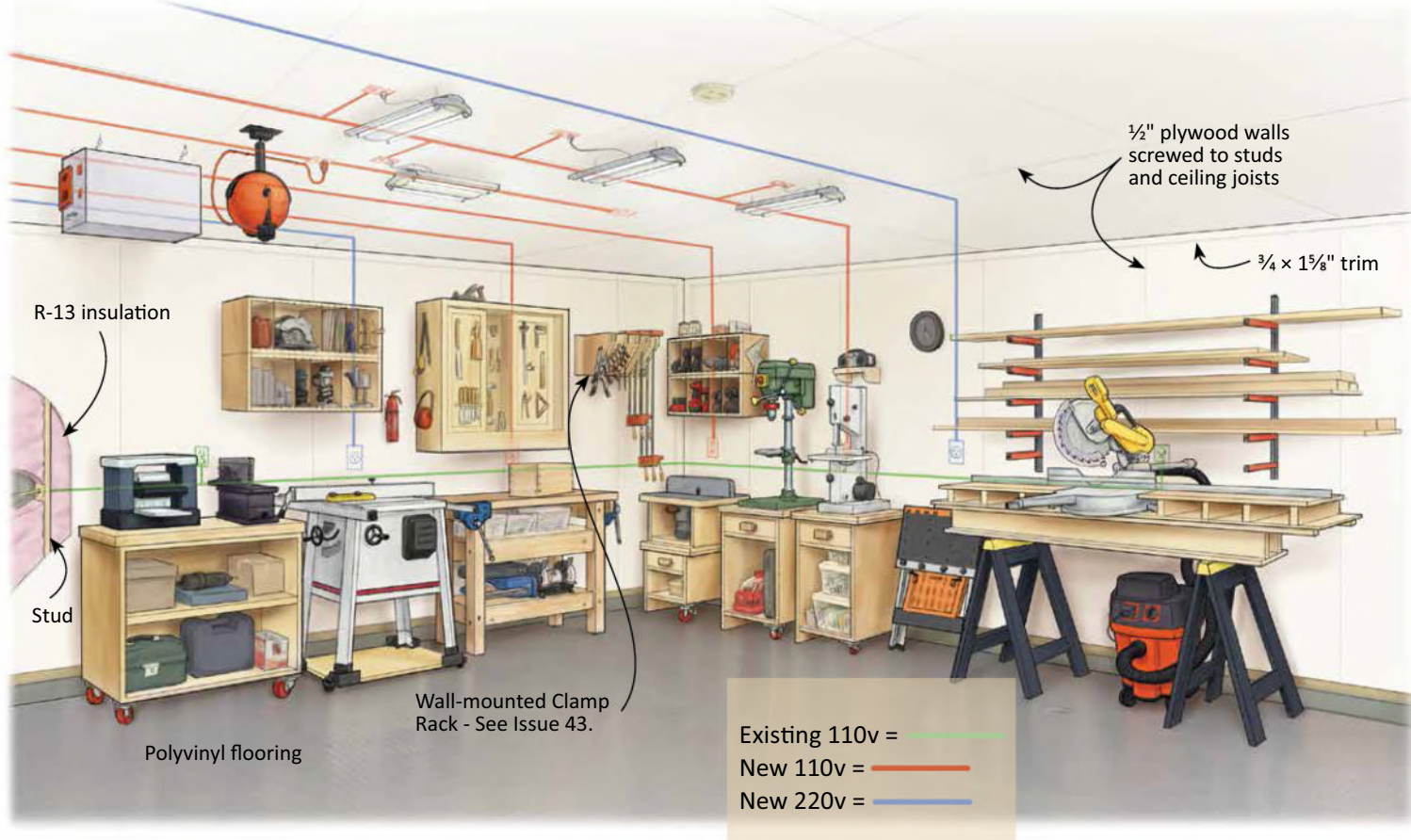


Home Shop



Before

Figure 1: Shop Layout



What's an up-and-comer?

By up-and-comer, we mean the woodworker who has successfully tackled a variety of DIY and woodworking assignments and who has accumulated a battery of hand tools, portable power tools, and key machines along the way. He or she now sees woodworking important enough to merit a dedicated workspace to house all of the tools, hardware, jigs, lumber, and sheet goods in one organized place. In this case, the shop shown belongs to our own up-and-comer Chad McClung, the magazine's art director. (Read about Chad's woodworking journey in "Cutting-In" on page 6.)

Chad's shop spans a 20 x 20' area at the back right corner of his two-car garage. And, with the exception of the hybrid JET 10"

tablesaw (#853321), the space is set up as a full-service benchtop power tool shop with the wiring and capacity to grow. Chad's goals reflect those of many up-and-comers. "My wife, Elizabeth, and I wanted a dedicated workspace with enough space to park her car and mine. For that very reason, a flexible design was a must. Casters and mobile bases solved the problem, letting me easily store the tools along the walls in an orderly fashion while the cars are inside. Elizabeth is quite good at DIY projects, so it was important to me that everything was organized and within easy reach within this 'shared' shop."

Prepping the shop

Starting with the bare-bones space in the **Before** photo on page 19, Chad began readying

the shop by meeting with an electrician to discuss his outlet and lighting needs. "I already had a 50-amp service panel in the garage, which, I was advised, was enough to supply my machine and lighting needs. While the panel serviced a few broadly spaced fluorescent fixtures and 110v outlets, I had the electrician add a 110v circuit for the four new LED ceiling fixtures, along with the needed ceiling receptacles. I had him wire three circuits for three new 110v wall outlets to supplement the two existing outlets. I also had him install two 220v circuits with two outlets for the day when I upgrade to a more substantial tablesaw, jointer, or other machine." (See **Figure 1.**)

For lights, we worked closely with Big Ass Light to spec ample general lighting for the unique



Chad had an electrician install the wiring for the power tools, lighting, and dust collection. Here, 110v and 220v circuits were added to meet anticipated needs.

demands of a woodworking shop—measuring, marking, fine joinery, sanding, and finishing. For more on this innovative lighting approach, see page 27.

Following the wiring, Chad insulated the walls with R-13 batt insulation and the ceiling with R-30. Soliciting a helper and using a rented drywall lift, he then covered the walls and ceilings with ½" fir plywood. "While drywall may be cheaper, I opted for a rugged, more functional surface to hang clamps, tools, and jigs." Chad painted the walls to lighten the

space and to better reflect the shop's lighting. At this point, he screwed on the receptacle plates and hung the LED light fixtures with J-hooks, S hooks, and chain.

Finally, Chad installed the polyvinyl rollout flooring to complete the prep work. (See page 26 for more.) He let the flooring acclimate to the cleaned concrete by letting the waviness flatten over a few days. Then he trimmed the edges of the two 10 × 20' rolls for a seamless coin pattern match as shown below. His last act was to apply adhesive-backed tape to the mating edges to keep them firmly bonded to the floor.

Must-have plans for a hardworking space

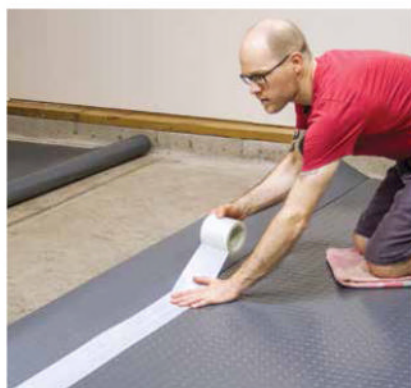
Functionality and storage are critical components for an efficient, successful shop. To address these needs, we designed a variety of projects you can build that take care of business for the up-and-comer and the more advanced woodworker as well. Included are the following: stout workbench with front and end vises and a pair of shelves; custom hand-tool cabinet with bypass tool-hanging doors and hardware drawer storage; torsion-box mitersaw station that sets up

on a pair of sawhorses; compact benchtop router table and fence; three benchtop power tool mobile carts in 2 × 2' and 2 × 4' top sizes with drawer and shelving storage; and tool cubby cabinet.

Tools and products

Of course, a shop's not real until you mix in tools. "In my shop, to better deal with costs, I opted for benchtop machines," says Chad. Among those shown are the Rikon bandsaw (#150503), helical cutterhead planer (#863179), jointer (#863672), belt/disc sander (#828577), and bench grinder (#158512). To these I added a General benchtop drill press (#841427), the DeWalt 12" sliding compound mitersaw (DWS780), and the Bosch 2.25 HP variable-speed router combo kit (1617EVSPK). Chad looked after his dust and chip collecting needs with the Fein shop vac (#861108) and Oneida's Dust Cobra Stationary Two-Stage Shop Vacuum (#159240). He hung a Laguna air-filtration system to capture fine particulate circulating in the space. And, in addition to the QuikBENCH portable workbench (#154760) for extra counter space, we threw in several products that serve to improve the shop, making it more useable, convenient, and downright enjoyable. (See "10 Home-Shop Improvements," page 24.) "Now it's time to put the space to good use," says Chad. "I'm looking to expand my skills and take on more challenging projects. The goal is to one day design and build a project that earns a spot on the cover of *Woodcraft Magazine*."

Note: All entries with product numbers are available at Woodcraft stores, woodcraft.com, or by calling (800) 225-1153.



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10 Home-Shop Improvements

Choice items for a harder working, more convenient environment

By Jim Harrold

You can only build so much when creating the shop you've always wanted. Certainly, the projects on the following pages

target the major needs of the up-and-comer woodworking shop. But they take time to make. And while they'll help you launch your hobby,

you'll find that there are cool products to buy that can make your workspace even better. Consider adding one or more of the following improvements.



Tune up your shop with a radio

No need to whistle while you work when you have this rugged jobsite radio on hand playing all of your favorite tunes. The PORTER-CABLE 20v Max radio features a pair of high-performance speakers offering crystal clear sound. In addition to its AM/FM/AUX reception and 12 station presets, the model

includes Bluetooth, letting you wirelessly stream music from a smart device. Power sources can be either a 20v Li-ion battery that provides up to 7 hours of runtime or the AC adaptor. (The 20v battery and charger are sold separately.) A hard plastic frame protects the radio from damage. Available at home centers; **\$90.**

Lightweight stands for heavy-duty work

Collapsing to a tidy 6" wide × 9" long bundle when not in use and weighing only 12 lbs, this 30½" steel stand can spread to 2 × 4' and hold up to 1,500 pounds. Named the Centipede Sawhorse because of its multiple legs, the stand can be nicely paired with a 2 × 4' sheet and serve as a support base for benchtop power tools, a table for assembly work, and other shop assignments. Place two together and you can quickly

make a 4 × 4' workstation. The stand comes with six P-Tops or plastic rests that protect sheets and the steel struts when cutting sheet goods; two Quick Clamps for locking tabletop materials in place; four X-Cups (not shown) for supporting 2 × 4s; and a handy carry bag. There's also a Centipede Support XL (not shown) for securing 4 × 8' sheets. For more, go to centipedetool.com. Available at home centers; **\$49.**





Get your cold drinks here!

Staying quenched and hydrated in the shop during warmer months is as critical to your well-being as achieving a perfectly crafted joint. Since most shops don't have a fridge, go with the next best thing—a quality personal cooler like this Roadie 20 by Yeti. The compact ice-retaining container keeps water bottles and power drinks crispy cold while preventing sandwiches from becoming warm and soggy. Measuring 13³/₄" w × 14³/₄" h × 19¹/₄" l, the ice chest features self-stopping hinges that keep the lid propped open when in use. Sold in three colors (white, tan, and blue), the cooler comes with a seal-tight locking system and a stainless steel carrying handle. Available through yeticoolers.com; **\$249.99**.

Rack'm, stack'm

Keep your stash of woodworking stock up and out of the way with this six-shelf rack by Portamate. Holding 110 pounds per shelf level, the rack consists of (12) 12¹/₂"-long brackets supported by two easy-to-install metal standards made of powder-coated steel tubes. Locate the brackets and standards at stud locations, spacing them as needed to provide the best overall support. Secure the standards using #8 × 3" screws. Woodcraft #152860; **\$74.99**.



Temp-taming cooler

Don't let summer heat drive you from the shop. Fight the furnace with a constant infusion of cool moist air from a Portacool Cyclone 3200. According to the maker, the evaporative cooler can lower temperatures by up to 30° F. Powered by a 115v outlet and requiring far less electricity than a window air conditioner, the money-saving unit can cool a 700-square-foot room with its

two-speed fan and adjustable louvers. It works off a 16-gallon refillable water tank or water hose. Should dust accumulate in the filter, remove it and wash it off. Important: Leave a door or window open when using the cooler to provide ventilation that assists in the evaporative cooling process. For more info, go to www.portacool.com. Available at home centers and tractor supply stores; **\$739**.



Quick & affordable shop flooring

Beat the brutal punishment dealt your dogs by a concrete shop floor. Improve to an easy-to-install polyvinyl rollout flooring from Better Life Technology's G-Floor. Rolls come in widths from 7½ to 10' and in varying lengths. While the vinyl is kinder to your feet than unforgiving concrete, it also provides a durable, textured surface for slip resistance. Sawdust settles out of the way between the raised coins that serve as the contact surface (other patterns are available). The flooring is also friendlier to dropped tools and offers some insulation from cold concrete. Cleanup is fast and easy with a push broom. Spills wipe up in a jiffy, leaving little or no discoloration behind. Available through the dealers listed at bltllc.com; **\$1.90-\$2.50/square foot.**



Too cool shop stool

Sit in comfort at your workbench on a retro Bottle Cap Shop Stool. The seat rotates 360° on its chrome base while a chrome ring provides parking for tired feet. With the overall weight capacity at 290 pounds and a 14"-diameter slightly concave seat, woodworkers of all sizes will find the stool the go-to place when seeking temporary relief during a long day of shop activities. A lever adjustment lets you raise or lower the seat from 23½" to 31½" to suit your leg length. Woodcraft #159244; **\$77.50.**

Power from above

Let's face it, power cords lack intelligence ... with the exception of the RoboReel power-cord reel by Great Stuff, Inc. This intelligent cord winder contains a microprocessor within a high-impact plastic shell that you can mount to a shop ceiling or

go with the portable model, for servicing up to three users at the same time—from power tools to lights to fans. With a simple push of the button in the cord's receptacle end, the "brain" in the RoboReel gently retracts the heavy-duty 50' 12-gauge (20 amp) cord without whiplash for out-of-the-way storage. And should the cord be severed, the unit will shut off the power. The reel also will not retract while a tool is in use. For more, go to roboreel.com/power-cord-reel/overview. Available through the above website; **\$279.**





Brighter future for woodworkers

Forever, your choices in shop lighting for doing precision work boiled down to power-gobbling incandescent bulbs or long, vulnerable fluorescent tubes that broke into a thousand pieces when dinged by a swinging board or clamp. Say hello to the Garage Light by Big Ass Light—the ultimate solution for tough, long-lasting general lighting in the home shop. Although the fixtures are compact (9" d × 4⁵/₈" h × 23⁵/₁₆" l), just one LED fixture puts out more light

than 15 60-watt incandescent bulbs (about 5,000 lumens and 5,000 kelvins). And while an incandescent bulb lasts on average 1,000 hours and a fluorescent bulb lasts 9,000 hours, the Garage Light provides a whopping lifespan of over 150,000 hours.

Better still, if you accidentally clobber the fixture with piece of lumber, it won't break (or even flicker). One reason: Lumen maintenance trays protect the LEDs and are simple to pull out, wipe down, and replace.

In fact, the cool running lights clean quickly and are ideally suited for dusty environments. If desired, you can add an automatic on/off motion sensor for \$40 for convenience and energy savings. To determine the number of lights for your workspace, get with a sales rep through www.bigasslight.com/products/garage-light.

Available online at <https://store.bigasssolutions.com/lights/shop-led.html> or by calling 1-877-244-3267; **\$399/fixture**.

Router table from a box

If you're not up to building your router table, consider assembling a full-service model from a box. The Precision Router Table System by Kreg features a 24 × 32" table, a 36" self-squaring T-square style fence with a micro-adjustable wheel, insert plate with levelers, and an assortment of rings. All of it sits atop a sturdy steel stand that adjusts from 29" to 35" to suit. For those wanting to partially design and build their own router table, the fence, table, and stand are also sold separately. View a product video on the Kreg YouTube Channel for more on the system. Woodcraft #160628; **\$499.99**.



The Weekend Workbench

Take the shortcut to building a stout, cost-effective work center.

Written by Jim Harrold and Chad McClung
Designed by Jim Harrold



Overall dimensions: 60"w x 24"d x 37"h

For the up-and-comer woodworker, this bench is a must-build. I teamed up with my art director, Chad McClung, to build this full-service shop workhorse. Materials run about half the cost of a store-bought bench with the same quality. It consists of rock-solid hardware, a factory laminated top, and meaty maple rails, stretchers, and legs. Better yet, with the plan provided, you can knock it out in a just a few days, provided you have the bits, plywood, and hardwood on hand.

Figuring Your Bench Height

There's no getting around it—tall woodworkers need a tall bench; short woodworkers, a short bench. And while most workbenches (base and top combined) stand between 32" and 38" high, the rule for arriving at the ideal height is to measure from the crease of your wrist to the floor. Note that a too-low bench height can lead to backache. There's also the issue of sitting height, which you can adjust by choosing the right stool.

In addition to the burly construction, I equipped the bench with a front and end vise and dog holes to provide purchase on workpieces, both large and small. Two Baltic birch

plywood shelves below the top offer plenty of handy storage. I bought plastic containers for keeping sanding and sharpening supplies at arm's reach to add to the bench's utility.

Figure 1: Exploded View Drawing

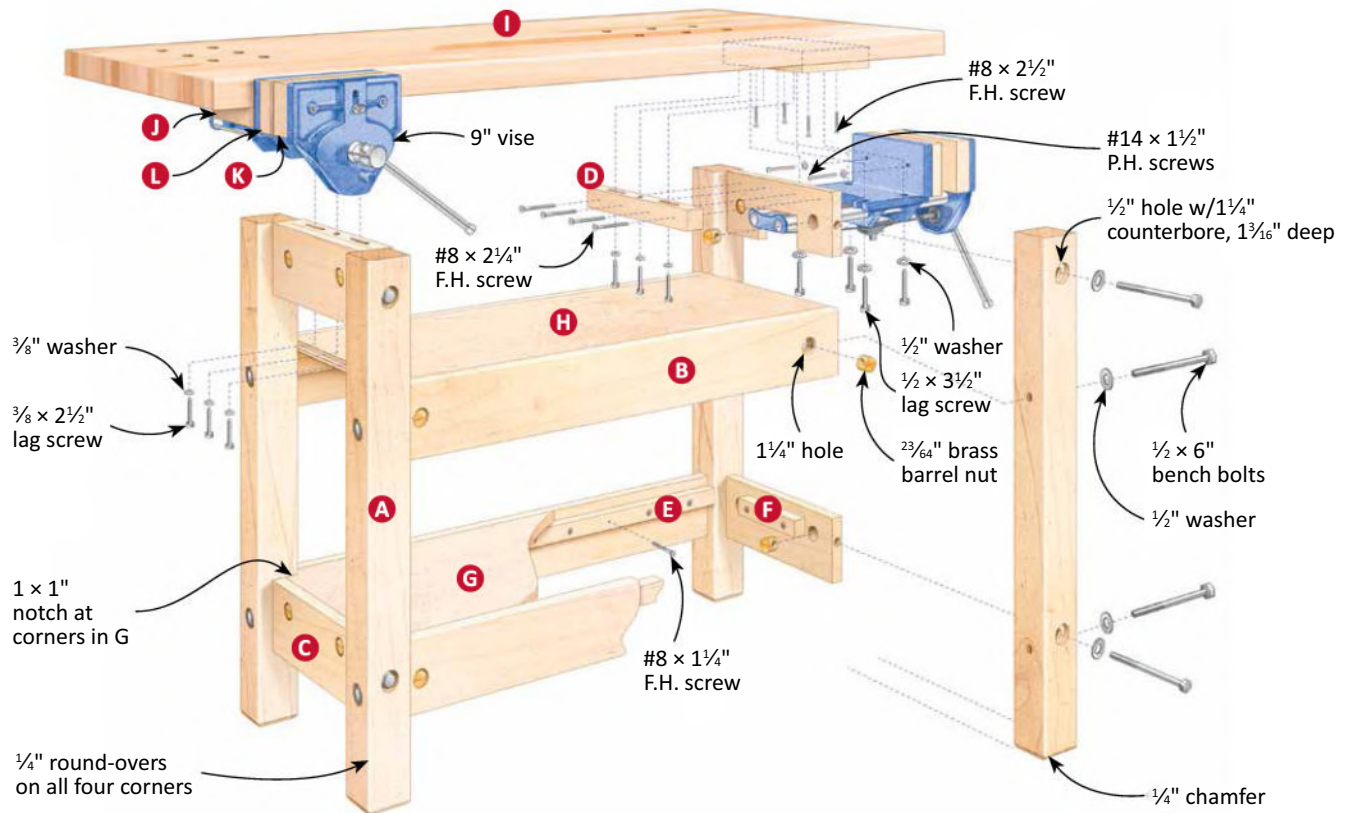
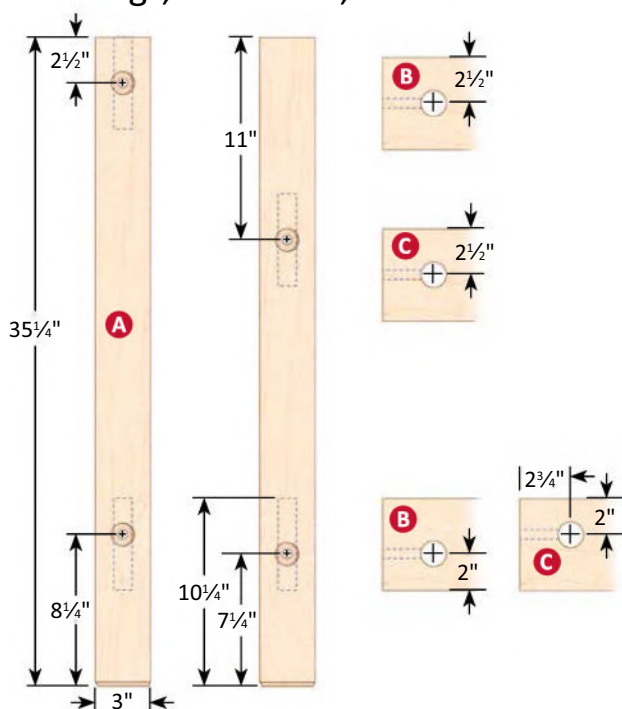
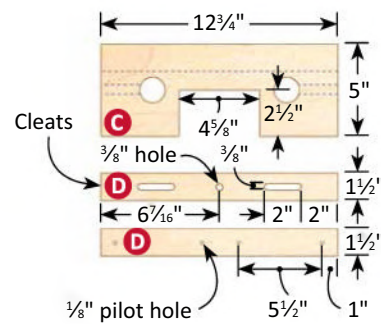


Figure 2: Parts Views

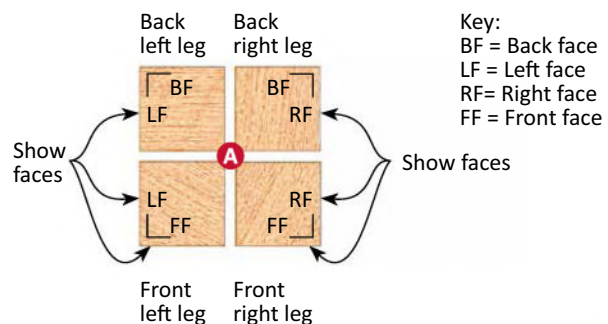
Legs, Stretchers, and Rails



Upper Right Rail



Leg Top Ends



Key:
BF = Back face
LF = Left face
RF = Right face
FF = Front face



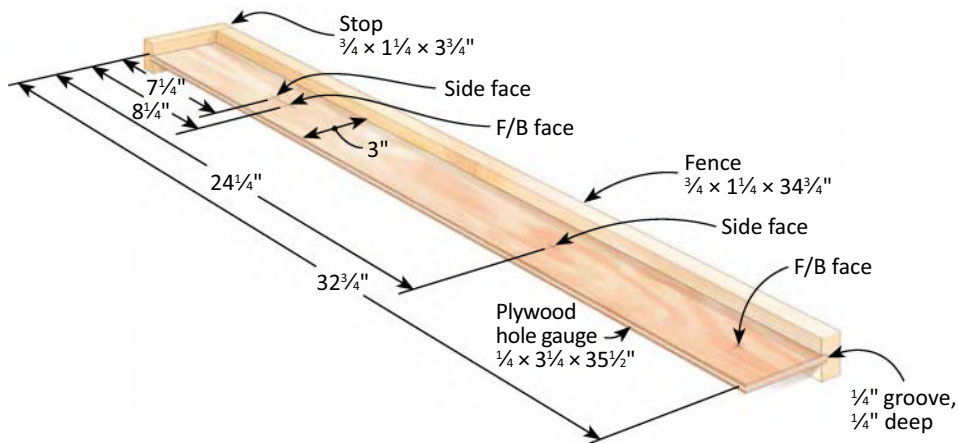
Set the jig against the leg, and drive the point of an awl through the holes in the jig to mark the bolt holes for the leg. If needed, darken the indents with pencil.

Nothing beats a great set of legs

1 Buy 3 × 3" squares found in the **Convenience-Plus Buying Guide** for the blanks for the four legs (A) shown in **Figure 1**. Or, glue up thinner stock, and then joint and plane the laminations to achieve the 3 × 3" blanks. Using a stop at the mitersaw, cut the leg blanks to the length in the **Cut List**, ensuring that the ends are square. See the box on page 28 for adjusting the bench to your ideal bench height.

Note: A few of the purchased squares may display rough-sawn surfaces or corners. If so, joint and plane all of the squares to

Figure 3: Leg Holes Marking Jig



a slightly smaller dimension.

2 Group the four legs together, and mark their top ends, as shown in the **Leg Top Ends Detail** in **Figure 2**. When doing so, have your best or "show" faces facing to the outside.

3 Make the **Leg Holes Marking Jig** in **Figure 3**. Lay out the hole locations on one face of the jig. (I made a 1 $\frac{1}{2}$ "-wide spacer out of scrap to mark the holes 1 $\frac{1}{2}$ " from the outside corners of the legs.) Drill $\frac{1}{16}$ " holes through the plywood at the marked locations. Label the holes on both faces of the jig to avoid confusion.

4 Fit the marking jig snugly against a front or back outside

corner of a leg (A) and against its bottom end. Then mark the bolt hole locations for that leg face where shown in **Figure 2** and as shown in **Photo A**. Turn the leg 90° and mark the bolt holes on the adjacent left or right outside face.

5 Install a 1 $\frac{1}{4}$ " Forstner bit in your drill press, set up a stop, adjust the fence, and bore the bottom-most counterbores $\frac{3}{8}$ " deep in the outside faces of the legs where marked. Switch to a $\frac{1}{2}$ " brad-point bit, and drill the through holes at this location, as shown in **Photo B**. Back the workpiece with scrap to prevent tear-out. Adjust the



With the stop in place, drill the $\frac{1}{2}$ " through holes in each leg, centering the bit in the counterbores. Back the bit out as needed to clear the flutes of debris.



With the legs ganged together, use a hand-held router, chamfer bit, and straightedge guide to chamfer the bottom edges.



D Secure the doweling jig on the end of a stretcher or rail, aligned with the layout line. Bore a $\frac{1}{2}$ " hole, 3" deep.



E Using the bench bolts, attach the rails and stretchers to the legs.

stop and repeat the procedure for the remaining holes.

6 Clamp the four legs together side by side, ensuring that the bottom ends are flush. Using a router and a $\frac{1}{4}$ " chamfer bit with a bearing, rout the bottom edges. (I used a straightedge guide to prevent the bits bearing from dipping into the chamfered edges and cutting beyond the planned chamfered edges.) Remove the clamps, rotate each leg 90°, flush the ends, and re-clamp. Again, rout the bottom edges, as shown in **Photo C**. Repeat for the remaining bottom edges.

7 Using a router equipped with a $\frac{1}{4}$ " round-over bit, rout the long edges of each leg.

Make the stretchers, rails, cleats, and shelf supports

1 Mill enough maple stock to 1" thick (or slightly under if starting with 1"-thick stock) for the front and rear stretchers (B) and the rails (C). Cut the stretchers and rails to the dimensions in the **Cut List**.

2 Lay out the hole locations in the ends of the stretchers and rails, where shown in **Figure 2**. Note that the holes are not centered in the lower stretchers and rails.

3 Mark the top edges and outside faces on each piece, and whether they are upper or

lower stretchers or rails. Using a doweling jig and a $\frac{1}{2}$ " bit, bore the end holes in the stretcher (B) and rails (C), where marked and as shown in **Photo D**.

4 Cuing off the layout lines for the stretchers (B) and rails (C) and referring to **Figure 2**, drill the $1\frac{1}{8}$ " through holes for the barrel nuts.

5 Using a $\frac{1}{8}$ " round-over bit, ease the outside edges of the stretchers (B) and rails (C).

6 Referring to **Figure 2**, lay out and jigsaw or bandsaw the notch in the top right-hand rail (C) to accommodate the end vise.

7 Cut two top rail cleats (D) to the size listed in the **Cut List**. Referring to the dimensions in **Figure 2**, lay out the $\frac{3}{8}$ " slots and through holes in the parts. Drill $\frac{3}{8}$ " holes in the end of the laid out slots and the hole locations. Using a jigsaw or scrollsaw, cut out the waste between the slot holes. Now, glue and screw the cleats to the top inside edges of the top rails, flushing the top edges.

8 Cut enough $1 \times 1\frac{1}{4}$ " material for the front/rear shelf supports (E) and the side shelf supports (F). Cut the front and rear shelf supports to the lengths in the **Cut List** minus $\frac{1}{8}$ ". Cut a small scrap piece of plywood from the material you intend to use for the top and bottom shelves (G, H) to serve a spacer when

locating the supports. Now, drill centered countersunk clearance holes in the shelf supports.

Assemble the base and add the top

1 Gather the legs (A), stretchers (B), and rails (C), and bolt the parts together, as shown in **Photo E** and where shown in **Figure 1**. Attach the rails to the legs before attaching the stretchers by holding the barrel nut centered in the through hole while threading the bolt in its hole. Install the top rails flush with the ends of the legs. To ensure proper positioning of the remaining rails and stretchers, strike lines on the inside faces of the legs indicating the top edges.

2 Using a spacer equal to the shelf thickness, position the shelf supports (E, F) so that the shelves sit flush with the top edges of the stretchers (B) and rails (C). Clamp the supports in place, drill $\frac{1}{8}$ " pilot holes into the rails, and then join the parts with glue and #8 $\times 1\frac{1}{4}$ " screws, as shown in **Photo F**.

3 Measure the openings for the shelves (G, H), and then cut the plywood to fit. Drop the top shelf into place to check the fit.

4 Lay out the notches on the bottom shelf and jigsaw out the waste. Drop the bottom shelf into the opening to test



With the spacer held flush to the top edge of the stretcher or rail, bring up the shelf support and screw it in place.

the fit. Remove the shelves and set them aside.

5 Solicit a helper to flip the base assembly and place it upside down on the bottom face of the benchtop (I). Guiding off the $\frac{3}{8}$ " holes and the center of the $\frac{3}{8}$ " slots in the top rail cleats (D), mark the lag screw locations with an awl. Slide the base out of the way. With a drill and a $\frac{5}{16}$ " brad-point bit, drill $\frac{3}{4}$ "-deep pilot holes in the top, as shown in **Photo G**.

6 Secure the base to the bench top with $\frac{3}{8}$ " lag screws and washers.

Add a pair of vises

1 Lay out the locations of the vise spacer blocks and the bench base legs, referring to

Figure 4. You want the vise screw centered in the notch in the upper right rail.

2 To ensure that the vises are mounted flush with the bench top, mill a blank to $1\frac{11}{16}$ "-thick for the vise spacer blocks (J). Now cut two spacer blocks from the blank using the dimensions in the **Cut List**. Locate them where shown in **Figure 4**, and clamp them in place. Ensure the outside edges are flush with the bench top (I). Drill pilot holes and then secure the spacers in place with $\#8 \times 2\frac{1}{2}$ " screws.

3 Place and center the vises on the spacer blocks on their intended outside edges, and mark the $\frac{1}{2}$ " lag screw holes. At the drill press, drill $\frac{1}{2}$ " through



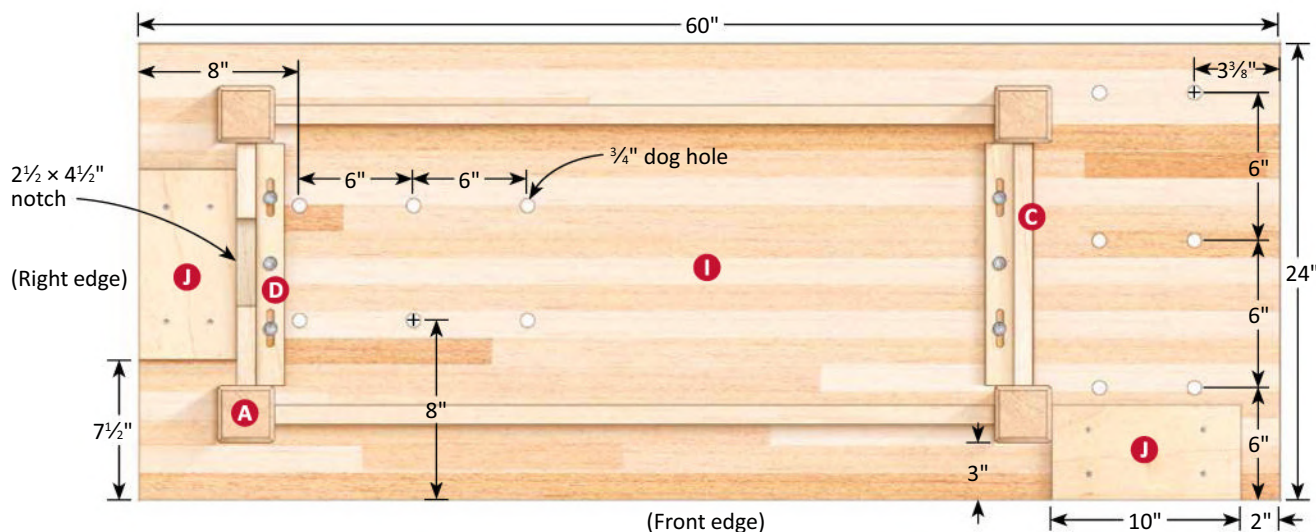
Drill pilot holes in the bottom face of the benchtop for the $\frac{3}{8}$ " lag screws used to attach the base.

holes at these locations. Drill the smaller countersunk pilot holes for attaching the spacers to the benchtop. Now, screw the blocks to the edges of the benchtop.

4 Guiding off of the clearance holes and using a $\frac{7}{16}$ " brad-point bit, drill 1"-deep pilot holes for the $\frac{1}{2}$ " lag screws in the bottom face of the benchtop. (Wrap tape around the bit to serve as a depth gauge so you don't drive it through the top.) Using a socket wrench, temporarily secure the vises to the benchtop with lag screws and washers, as shown in **Photo H**.

5 Open the vise jaws, insert an awl in the holes in the inside jaws, and mark their location on the edges of the

Figure 4: Benchtop Layout (Bottom Face Shown)





H Ratchet down the lag screws to firmly secure the vises in place.



I Using your drilling jig and backer board to prevent tear-out, drill dog holes in your benchtop.

bench. Remove the vises and bore $\frac{1}{2}$ " holes $\frac{1}{4}$ " deep at these locations to accommodate the cheek hardware.

6 Mill and cut a pair of outside vise jaw cheeks (K) and a pair of inside vise jaw cheeks (L) to the sizes in the **Cut List**. At the drill press, bore $\frac{3}{4}$ " through holes centered 1" in from the ends of the $1\frac{1}{2}$ " outside cheeks. Clamp one inside and one outside jaw cheek together between the jaws of one vise, centering them from side to side and flushing them with the top edges of the jaws. Drill pilot holes at the screw locations and then screw the cheeks to the jaws with $\#14 \times 1\frac{1}{2}$ " panhead screws and washers. Repeat for the other vise. Bolt both vises to the bottom of the benchtop.

7 Do a final sanding all around the base with 220-grit sandpaper. Then, solicit a helper to flip the completed bench onto its legs.

8 Make a drilling jig out of a $1\frac{1}{2} \times 1\frac{1}{2}$ " piece of scrap. (A 2×4 would work equally well.) At the drill press, drill vertical through holes in the jig. (I bored three $\frac{3}{4}$ " holes, spaced 6" apart.) Strike layout lines for the dog holes that are centered on the vise cheek (K) dog holes. Now, center the jig over the hole locations, and clamp it in place. Drill the dog holes as shown in **Photo I**.

9 Wipe clean the surfaces of the base and apply a finish. (I used Waterlox Original Sealer Finish.) Finish the plywood shelves as well. Let dry.

10 Locate the bench in your shop, and drop in the shelves. Pull up a stool, and take a few minutes to enjoy this new workhorse addition to your shop. ■

Workbench Cut List

	Part	Thickness	Width	Length	Qty.	Mat'l
A	Legs	3"	3"	35	4	M
B	Front/rear stretchers	1"	5"	$37\frac{7}{8}$ "	4	M
C	Rails	1"	5"	$12\frac{3}{4}$ "	4	M
D	Top rail cleats	$1\frac{1}{2}$ "	$1\frac{1}{2}$ "	$12\frac{3}{4}$ "	2	M
E	Front/rear shelf supports	1"	$1\frac{1}{2}$ "	37"	4	M
F	Side shelf supports	1"	$1\frac{1}{2}$ "	6"	2	M
G	Bottom shelf	$\frac{3}{4}$ "	$14\frac{3}{4}$ "	$39\frac{7}{8}$ "	1	BP
H	Top shelf	$\frac{3}{4}$ "	$14\frac{3}{4}$ "	$37\frac{7}{8}$ "	1	BP
I	Laminated benchtop	$1\frac{3}{4}$ "	24"	60"	1	LM
J	Vise spacer blocks	$1\frac{3}{4}$ "	5"	10"	2	M
K	Outside jaw cheeks	$1\frac{1}{2}$ "	$3\frac{3}{4}$ "	9 $\frac{5}{8}$ "	2	M
L	Inside jaw cheeks	1"	$3\frac{3}{4}$ "	9 $\frac{5}{8}$ "	2	M

Materials: M=Maple, BP=Birch Plywood, LM=Laminated Maple

Hardware/Supplies: (16) $\#8 \times 2\frac{1}{2}$ " flathead screws; (26) $\#8 \times 1\frac{1}{4}$ " flathead screws; (8) $\#14 \times 1\frac{1}{2}$ " panhead screws; (6) $\frac{3}{8} \times 2\frac{1}{2}$ " lag screws; (8) $\frac{1}{2} \times 3\frac{1}{2}$ " lag screws; (6) $\frac{3}{8}$ " washers; (8) $\frac{1}{2}$ " washers.

Convenience-PLUS BUYING GUIDE

☐ 1.	Bench Bolts, $\frac{1}{2} \times 6$ " Hex Bolts, Washers, $\frac{23}{64}$ " Brass Nuts, 4/pkg., (4 pkg. needed)	#159649	\$19.99
☐ 2.	Laminated Maple Benchtop, 24 x 60", prefinished	#145685	\$219.99
☐ 3.	Soft Maple Squares, 3 x 3 x 36", (4 needed)	#840483	\$31.50
☐ 4.	Deluxe Doweling Jig	#811656	\$59.89
☐ 5.	Freud Chamfer Bit, 45°, $\frac{5}{8}$ " CL, $\frac{1}{4}$ " SH	#828726	\$32.47
☐ 6.	Eclipse 9" Quick-Release Vise, (2 needed)	#152634	\$144.89
☐ 7.	Waterlox Original Sealer Finish, 1 qt.	#37J21	\$31.50
☐ 8.	Sjöbergs Bench Dogs, $\frac{3}{4}$ ", 4/pkg.	#146476	\$45.50

Above items are available at Woodcraft stores, woodcraft.com or by calling (800) 225-1153. Prices subject to change without notice.



Custom Hand-Tool Cabinet

This full-service shop in a box sports sliding doors, shelves, tool holders, and drawers.

Designed and built by Tom Whalley
Written by Marlen Kemmet

Overall dimensions:
48¼" w × 11" d × 39½" h

Save all kinds of shop time by keeping your go-to hand tools, glue, and choice hardware in this dedicated wall-hung cabinet. Two bypass doors spaced 3" apart provide handy surfaces for attaching specialty tool holders, while a perforated hardboard panel at center offers even more

hanging options. Adjustable shelves serve as parking places for planes, bottles, and miscellaneous. Added to this are 11 drawers along the cabinet's bottom for dowels, screws, nails, and other often-used hardware.

You'll find building the cabinet an exercise in basic tablesaw

work. Assembly boils down to gluing and screwing the carcass parts together. And while the sliding doors rely on stub tenon joinery and a unique roller mechanism, the simple drawers draw their strength from butt-jointed parts that are glued and nailed together.

Figure 1: Exploded View

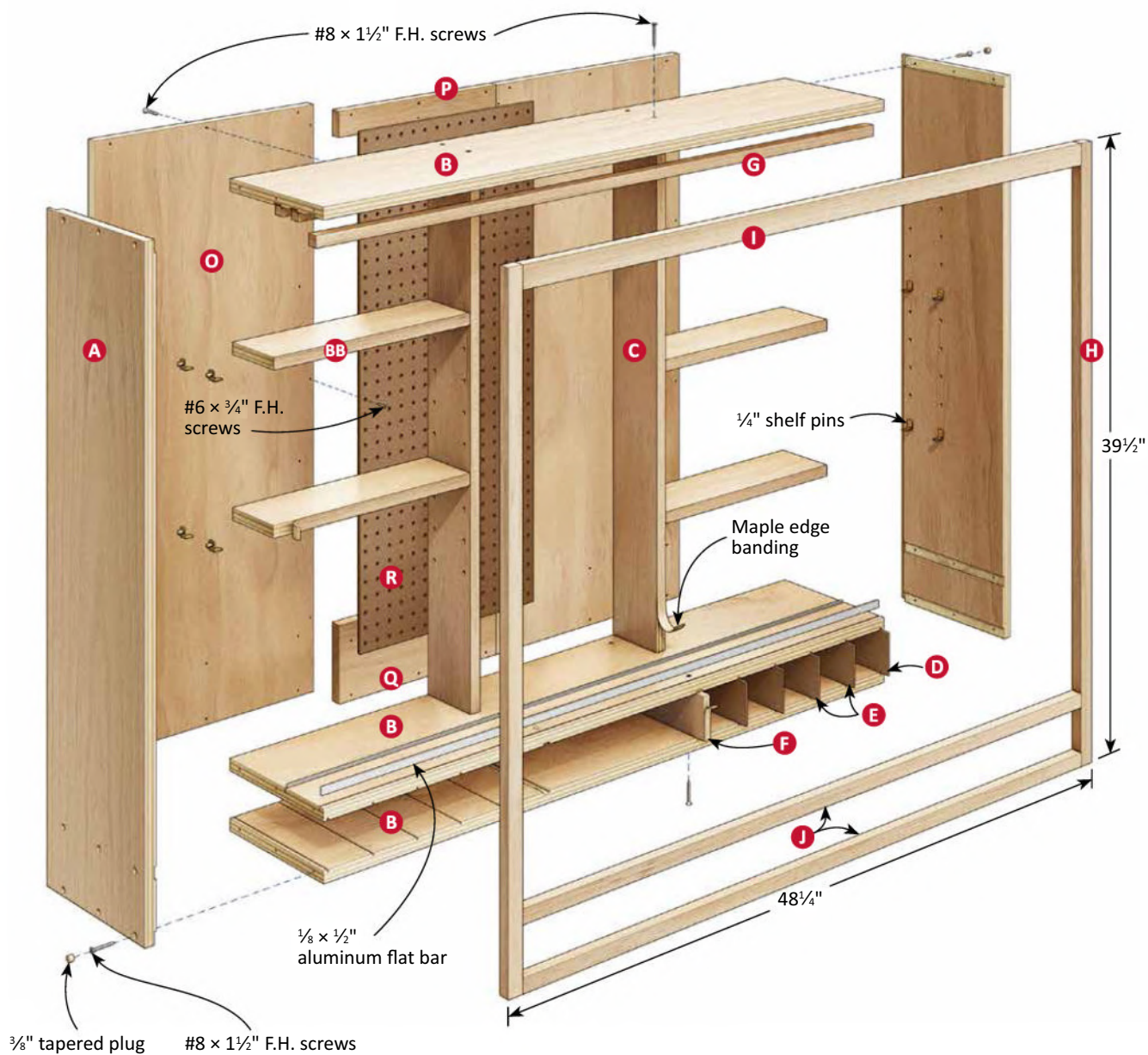
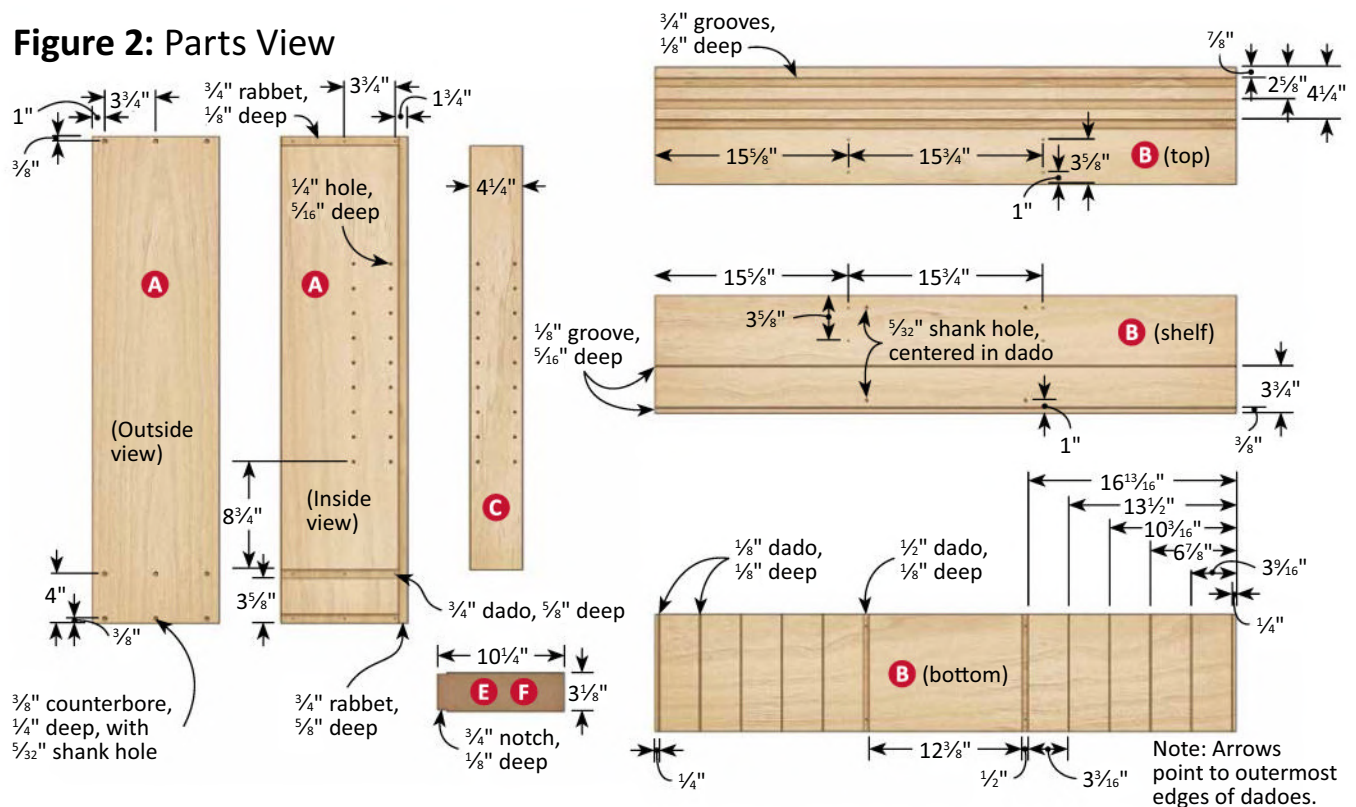


Figure 2: Parts View



Start with the carcass

1 From $\frac{3}{4}$ " plywood (I used birch), cut the carcass sides (A), top, shelf, and bottom (B), and case dividers (C) to the sizes in the **Cut List**. Apply heat-sensitive veneer edge banding to the front edges of the case dividers. Trim and sand the edging. You could also cut thin strips of solid stock and glue them to the

fronts of the plywood supports.

2 Cut the dadoes and rabbets on the inside faces of both sides (A). Drill counterbored holes in the outside of the sides, where shown in **Figures 1** and **2**. You'll plug the counterbored holes after assembling the carcass parts.

3 Mark the locations and cut the grooves (**Photo A**) in the bottom face of the top and the top face

of the shelf (B) for adding the top runners (G) and aluminum flat bar later (**Figure 2**). (I used a Forrest Woodworker II 40T #1 Grind for a flat-bottomed cut.)

4 Cut the drawer dividers (D, E, F) to size, notching the front corners of E and F, where shown in **Figure 2**.

5 Mark the locations for the drawer dividers (E, F) on the



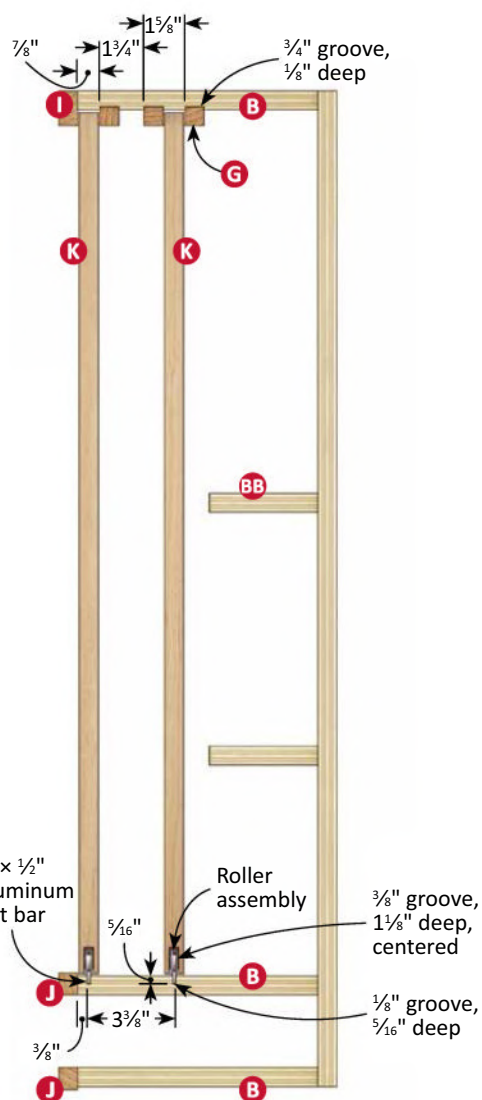
A Cut the runner grooves on the tablesaw with fence and featherboard.



B Cut the dadoes for the drawer dividers using an auxiliary miter-gauge fence and stop.



Figure 3: Section View



Clamp corner braces at the corners to keep adjacent parts at 90° to each other, snug the parts with clamps, and then glue and screw the assembly together.

front edge of the bottom (B) using **Figure 2** for reference. With a $\frac{1}{8}$ " blade in your tablesaw, cut the dados where marked $\frac{1}{4}$ " in from the ends. (To keep the dados evenly spaced, I cut and attached an auxiliary wood fence to my tablesaw miter gauge.) Cut dados in the top face of the bottom and bottom face of the shelf (**Photo B**). Using a stop on the tablesaw auxiliary fence allows you to cut four dados on the two pieces with a single setup. Adjust the stop for each sequence of four cuts.

6 Switch to a $\frac{1}{2}$ " dado set, and cut the dados for the center drawer dividers (F).

7 Mark the centerpoints (**Figure 2**), and drill the screw-mounting holes in the bottom

face of the top and top face of the shelf (B) for attaching the case dividers (C) later.

Drill screw-mounting holes through the shelf and bottom centered in the $\frac{1}{2}$ " dados.

8 Dry-clamp the sides, top, and shelf (A, B) and case dividers (C) to check the fit of the mating pieces. Once the fit has been verified, glue and screw the assembly together, checking for square (**Photo C**). We'll add the bottom (B) later.

9 Finish the top of the bottom (B) now. (I used a lacquer sanding sealer and sprayed on a semi-gloss lacquer, sanding between coats with 320-grit sandpaper.) The drawers will slide easier on a finished surface. Glue and clamp the

Figure 4: Shelf-Pin Hole Template

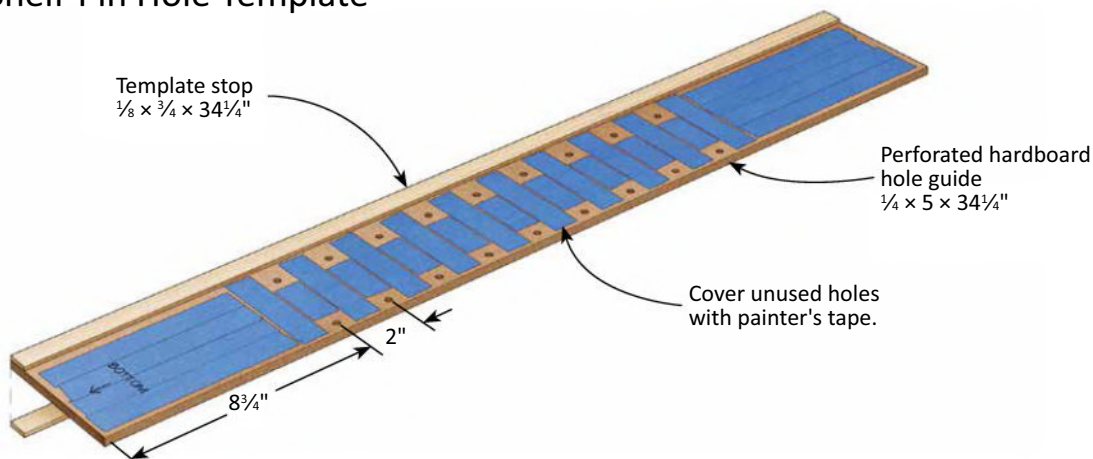
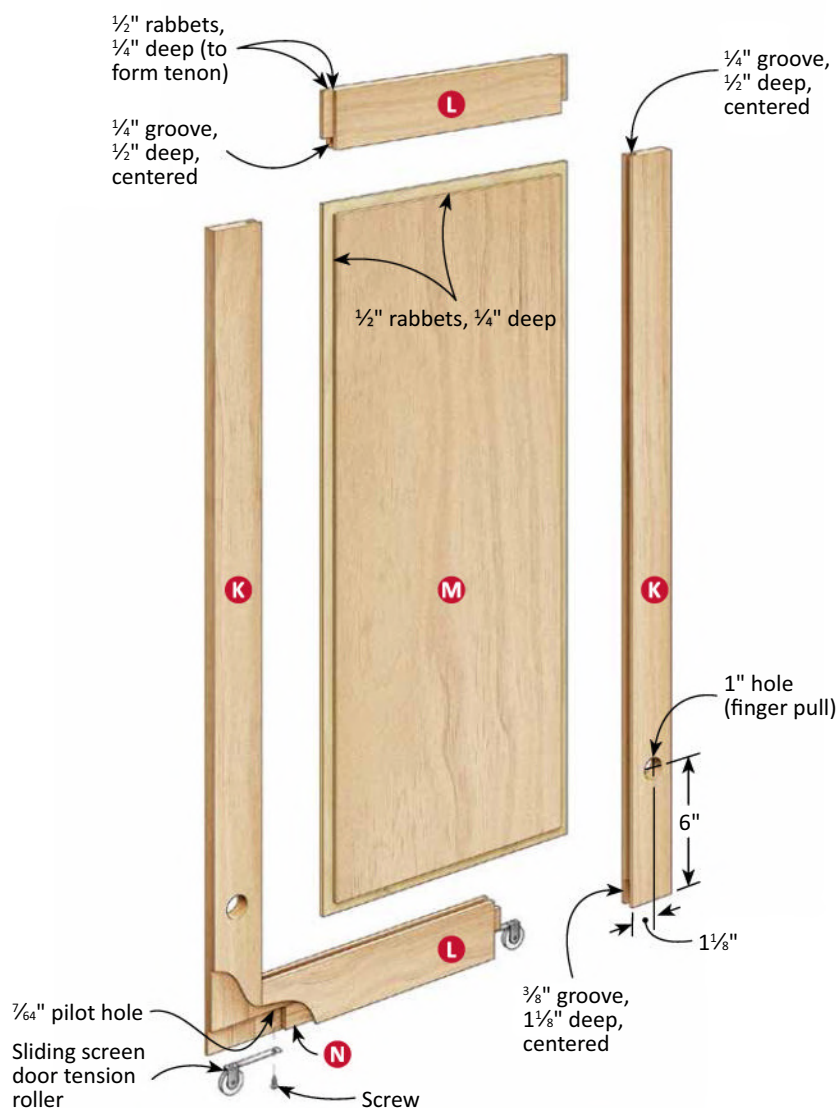


Figure 5: Door Exploded View



bottom (B) and the two center drawer dividers (F) to the carcass assembly (A/B/C).

10 Cut the top runners (G) to size. Glue and clamp the runners in place.

11 Cut the carcass front trim pieces (H, I, J) to size from solid stock. Glue and clamp the trim pieces to the cabinet carcass. (See **Figure 3**.)

12 Insert $\frac{3}{8}$ " plugs in the sides (A), where shown in **Figure 1**. Then, trim the plugs flush and sand them smooth.

13 From $\frac{1}{4}$ " perforated hardboard (Peg-Board), cut the shelf-pin hole template (**Figure 4**) to size. Cover the holes you don't need with painter's tape. Add a pair of stops to the template, where shown on the drawing. Use the template as a guide to drill $\frac{1}{4}$ " holes $\frac{3}{8}$ " deep in the carcass, where shown in **Figures 1** and **2**, for adding the shelves later (**Photo D**).

14 Finish-sand the carcass and apply a finish.

15 Using a hacksaw, crosscut $\frac{1}{8} \times \frac{1}{2}$ " aluminum flat bar to length. Insert (friction fit) the bars into the $\frac{1}{8}$ " grooves in



D Use a perforated hardboard piece to serve as a shelf-pin hole template to ensure consistently spaced shelf-pin holes.



E Use a miter gauge, dado set, and stop to cut consistent tenon shoulders on the ends of the door stiles.



F Glue and clamp the door stiles, rails, and panel together. Repeat for the remaining door. If needed, wipe up any squeeze-out with a dampened cloth.



G Use a tablesaw, dado set, featherboard, and rip-fence saddle to cut the centered groove along the bottom edge of the door.



H Drill the pilot holes, and then screw the rollers in place in the door bottom grooves.

the shelf (B). The bars act as tracks for the sliding screen door tension rollers to ride on later. If the bars fit loosely, add a few drops of instant glue.

Build two sliding doors

1 To create the two sliding doors, start by cutting the stiles (K) and rails (L) to the sizes in the **Cut List**.

2 Cut $\frac{1}{4}$ " grooves $\frac{1}{2}$ " deep centered along the inside edges of K and L. Now, rabbet the ends of the rails (L) to create tenons that fit into the

grooves in K (**Photo E**).

3 Mark the hole centerpoints on each stile (K) for the 1" finger pulls and drill the holes at the drill press. Sand the holes if necessary to remove any sharp edges or roughness.

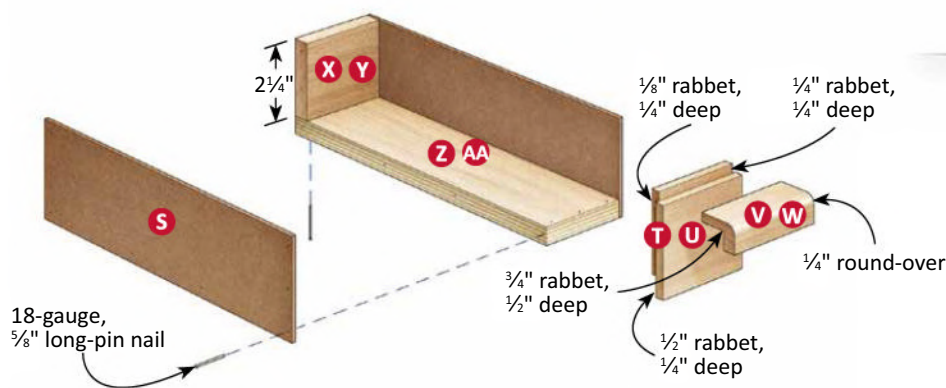
4 Cut the door panels (M) to size. Cut a $\frac{1}{2}$ " rabbet $\frac{1}{4}$ " deep along the front edges of both door panels. This allows the front edge of the panels to be flush with the front edge of the stiles and rails. The flat door fronts create maximum space for securing tool holders

and tools later. Dry-clamp the pieces to check the fit.

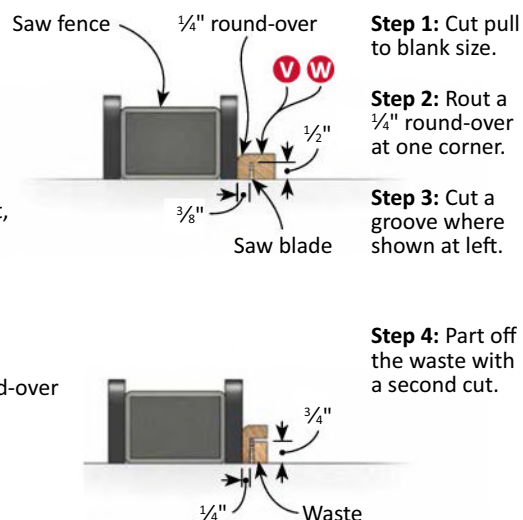
Then, glue and clamp the doors together (**Photo F**).

5 Cut a $\frac{3}{8}$ " groove $1\frac{1}{16}$ " deep (**Figure 5**) centered along the bottom edge of each door, as shown in **Photo G**, to house the roller track and filler (N). I used a tall rip-fence saddle and featherboard on my tablesaw for maximum stability of the door when cutting the groove. Before making the cut, I scored the top trailing edge of the stile where the blade would exit the

Figure 6: Drawer Exploded View



Pull Blank Cutting Sequence





I After gluing the pull blank to the drawer front blank, crosscut the drawer fronts to final length at the tablesaw.



J Use a standard saw blade and a stop clamped to the auxiliary miter gauge fence to cut the rabbets in the ends of the drawer fronts. (Note: Half of the cuts are made with the miter gauge in the left-hand table slot, and the other half in the right-hand slot.)

stock to prevent chip-out.

6 Cut the fillers (N) to size and glue them in place, centered end-to-end in the groove. Now, position the sliding screen door tension rollers against the filler. Screw them in place (**Photo H**).

7 Finish-sand both doors, mask off the rollers, and apply finish to the doors.

Cut the back pieces

1 Cut the back pieces (O-R) from the materials and sizes noted in the **Cut List**.

2 Position the two back panels (O) into the carcass rabbets, and draw a light line around the inside locating the area available for displaying tools. Mask off the area to remain unfinished (outside the marked

lines), and apply finish to the front faces of the back panels.

3 Mark and drill the countersunk mounting holes through the back panels (O) for mounting to the carcass later. Sand and finish all but the back panel (R).

Make the drawers and shelves

1 Cut the 22 drawer sides (S) to the dimensions shown in the **Cut List**.

2 For the small and large drawer fronts (T, U), cut a 1/2"-thick piece of solid stock to 2 3/4" wide by 60" long. Cut a 1/4" rabbet 1/4" deep along one edge, where shown in **Figure 6**, for adding the pulls (V, W) later. On the opposite surface, cut a 1/2" rabbet 1/4" deep along the bottom edge.

3 Cut a 3/4" x 1 1/8" x 60" blank for the drawer pulls (V, W). Rout a 1/4" round-over along one edge of the blank. Continue with the pull blank sequence by following steps 3 and 4 in the **Pull Blank Cutting Detail** in **Figure 6** to create a 3/4" rabbet 1/2" deep along the back edge of the blank. Then, glue and clamp the drawer front blank to the door handle blank. I used a scrap piece of 1/2"-thick stock under the pull to serve as a spacer to hold the handle blank square to the drawer front blank until the glue dried.

4 Crosscut the drawer fronts (T, U) and attached blank for the pulls (V, W) to length, as shown in **Photo I**. Number the blanks so you can install the drawers in the same order later. This ensures that you'll have the grain flowing along the drawer fronts.

5 Cut a 1/8" rabbet 1/4" deep along the ends of each drawer front assembly (**Photo J**) for fitting against the drawer sides.

6 Cut the drawer backs (X, Y) and the drawer bottoms (Z, AA) to size from 1/2" plywood. Glue, clamp, and pin-nail the drawers together, as shown in **Photo K**.

7 Cut the shelves (BB) to fit the cabinet and apply heat tape to the shelf fronts. Trim the excess.

8 Sand and apply finish to the drawers and shelves.



K Using a drawer side as a spacer to flush the drawer back, bottom, and front rabbeted edges, glue and pin-nail the parts together. Then permanently add the sides.

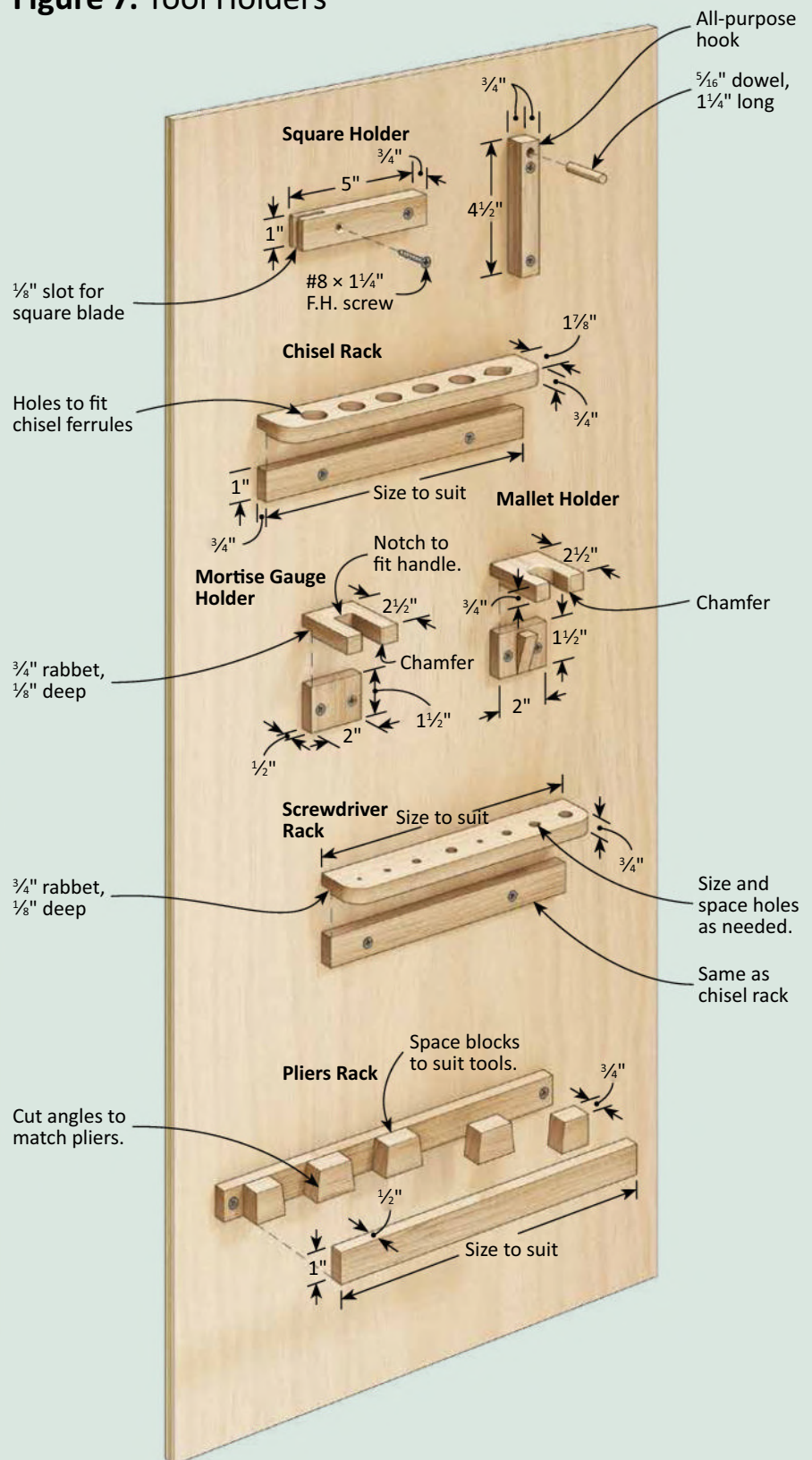
Add the tool holders next

The plywood back panels (O), perforated hardboard panel (R), and shelves (BB) give you three different options for organizing your tools. Start the process by laying out your tools on the back panels, keeping in mind the location of any shelves you intend to use. Once you've located where you want your tools, consider taking a picture for reference later. Now, using the drawings for reference in **Figure 7**, build the tool holders that best fit your particular needs. Lay out the tools again with the tool holders on a back panel (or door front), as shown in **Photo L**. Using the holes in the holders as guides, drill pilot holes in the back panels and doors for mounting the tool holders later. Use the specialized store-bought hardware available to mount tools on the perforated hardboard (R).



After deciding what tools you want to hang, build the appropriate holders and test-fit your layout on a panel or door face, adjusting the spacing as needed.

Figure 7: Tool Holders



Add the backs and hang the cabinet

1 With the back panels (O) laid out and holes drilled, glue and screw them to the back of the carcass.

2 Glue and screw the upper back (P) and lower back (Q) to the top (B) and dividers (C). Flip the cabinet over, and screw the center panel (R) to the carcass.

3 Locate the studs in the wall where the cabinet is to be hung. Mark screw-hole locations on the back panels (O), and drill holes for securing the cabinet to the studs. With the aid of a helper, hang the cabinet, making sure it is level.

4 Install the doors by inserting the top of one door between the middle and back top runners (G) and dropping it onto the metal track on the shelf (B). Repeat the process by inserting the other door into the front space between the front trim and front runner (G).

5 Screw the tool hangers to the back panels (O) and door fronts and use perforated hardboard hooks for hanging tools on the center panel. Drop in the adjustable shelves, and stock your cabinet, making it ready and available for all of your woodworking needs. ■

About the Project Team

With more than 70 combined years of woodworking, Iowans Tom Whalley and Marlen Kemmet serve as frequent contributors to *Woodcraft Magazine*. They collaborate on the designing, building, and writing of each magazine assignment.

Tool Cabinet Cut List

	Part	Thickness	Width	Length	Qty.	Mat'l
A	Sides	3/4"	10 3/4"	39 3/8"	2	BP
B	Top, bottom, shelf	3/4"	9 1/2"	47"	3	BP
C	Case dividers	3/4"	4 1/4"	34 5/16"	2	BP
D	End dividers	1/8"	3 1/8"	9 1/2"	2	TH
E	Dividers	1/8"	3 1/8"	10 1/4"	8	TH
F	Center drawer dividers	1/2"	3 1/8"	10 1/4"	2	BP
G	Top runners	3/4"	3/4"	46 3/4"	3	M
H	Side trim	3/4"	1"	39 1/2"	2	M
I	Top trim	3/4"	1 3/8"	46 3/4"	1	M
J	Trim	3/4"	7/8"	46 3/4"	2	M
K	Stiles	3/4"	2 1/4"	34 5/16"	4	M
L	Rails	3/4"	2 1/2"	12 3/4"	4	M
M	Door panels	1/2"	12 3/4"	30 5/16"	2	BP
N	Rail fillers	3/8"	7/8"	9 1/4"	2	M
O	Back panels	3/4"	17 1/4"	39 3/8"	2	BP
P	Upper back	3/4"	1 3/4"	13 1/2"	1	BP
Q	Lower back	3/4"	5 1/4"	13 1/2"	1	BP
R	Center back	1/4"	14 7/8"	34 3/4"	1	PH
S	Drawer sides	1/8"	2 3/4"	10"	22	TH
T*	Small drawer fronts	1/2"	2 3/4"	3 1/8"	10	M
U*	Large drawer front	1/2"	2 3/4"	12 5/16"	1	M
V*	Small drawer pulls	3/4"	1 1/8"	3 1/8"	10	M
W*	Large drawer pulls	3/4"	1 1/8"	12 5/16"	1	M
X	Small drawer backs	1/2"	2 1/4"	2 7/8"	10	M
Y	Large drawer back	1/2"	2 1/4"	2 1/16"	1	M
Z	Small drawer bottoms	1/2"	2 7/8"	10"	10	BP
AA	Large drawer bottom	1/2"	12 1/16"	10"	1	BP
BB	Adjustable shelves	3/4"	4 1/4"	15"	6	BP

*Indicates parts that are initially cut oversized. See instructions.

Materials: BP=Birch Plywood; TH=Tempered Hardboard; M=Maple;

PH= Pegboard Hardboard

Hardware/Supplies: #8 x 1 1/4" flathead screws; #8 x 1 1/2" flathead screws; #6 x 3/4" flathead screws; (2 packs of 2 rollers) sliding screen door tension rollers; (2) 1/8" x 1/2" aluminum flat bar, 48" long; 18-gauge, 5/8" pin-nails or 5/8" brads; 1" finish nails.

Convenience-PLUS BUYING GUIDE

☐ 1.	Forrest Woodworker II 10" 40T #1 Grind	#153696	\$139.99
☐ 2.	Maple Edge Banding, 7/8" x 25'	#147432	\$8.99
☐ 3.	Edge-Banding Iron, non-stick coating, thermostatic heat control	#144952	\$39.99
☐ 4.	Tapered Plugs, 3/8", 100/pkg.	#50K11	\$3.19
☐ 5.	Shelf Pins, 1/4", Brass, Bracket Style, 25/pkg.	#27114	\$4.79
☐ 6.	Zinsser Bulls Eye Seal Coat Sanding Sealer, 1 qt.	#823195	\$18.99
☐ 7.	Watco Lacquer, Semi-Gloss Spray, 11 1/4 oz. can	#146948	\$9.50

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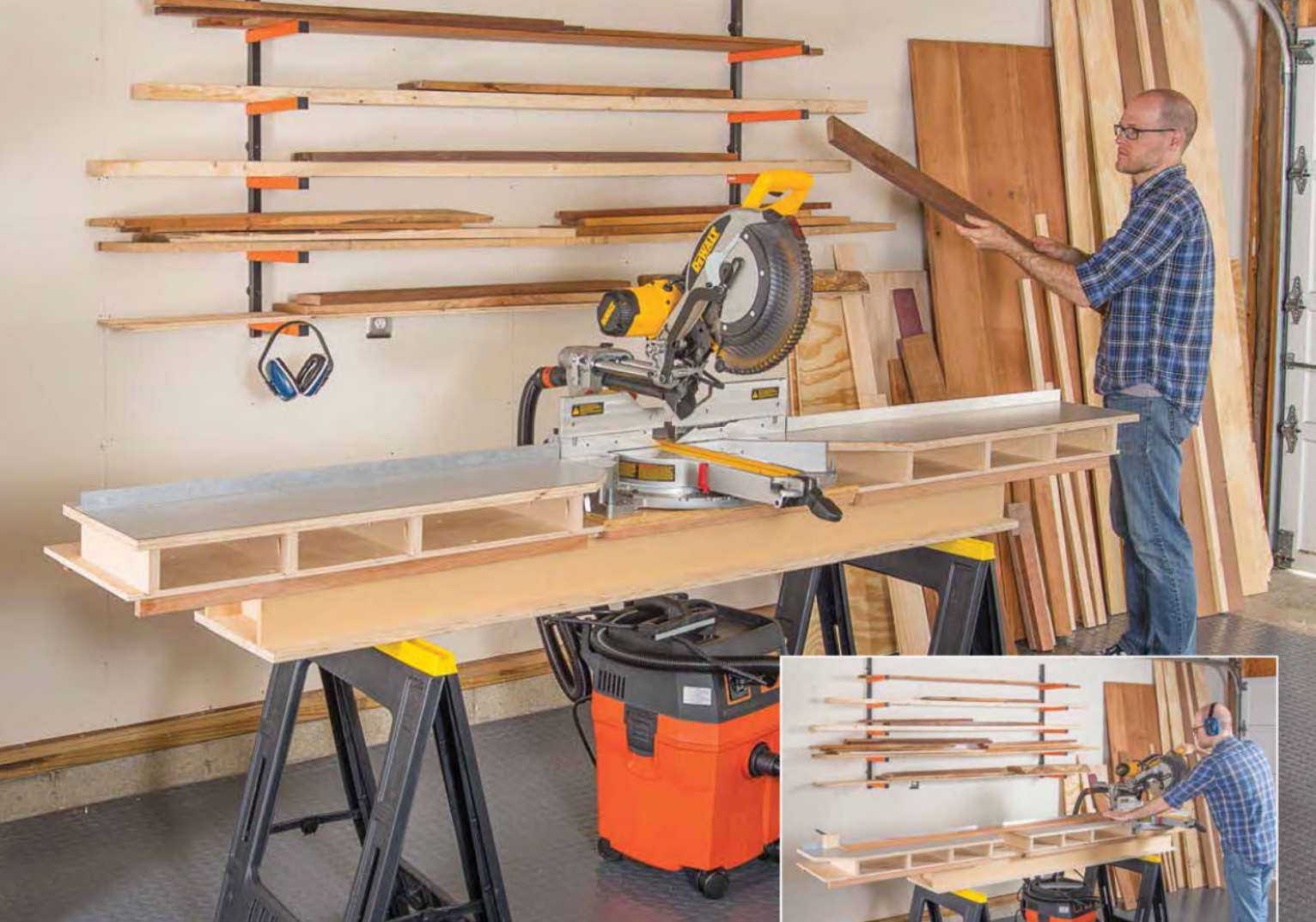
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Torsion-Beam Mittersaw Station

A full-featured cutting station for use in (and out of) the shop

By Joe Hurst-Wajszczuk

Overall dimensions:
78"w x 15"d x 11½"h

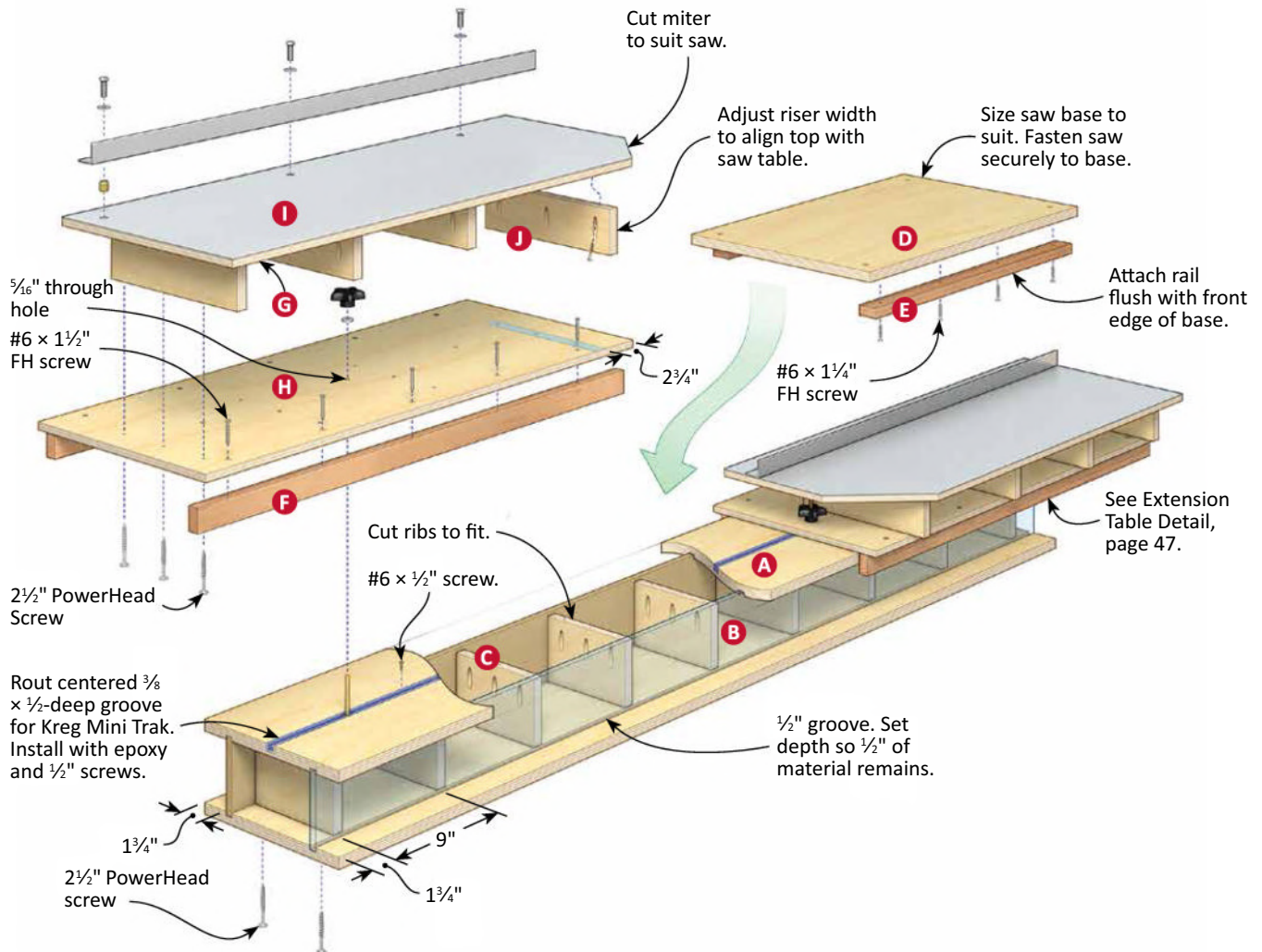
Sometimes less is plenty. The “deluxe” mitersaw workstation I designed a few years ago (Oct/Nov 2011, Issue #43) suits my needs very well, but I realize that a cutting station/lumber rack/storage cabinet might be a bit much for some shops. This time, I kept the focus on the saw. The result is a simple, solid station that’s well suited

not only for woodworkers who are starting out (often in cramped quarters), but also for folks who take their tools out of the workshop.

The station’s main selling point is the adaptability of the connection between the extension tables and the torsion beam that supports them. For typical cuts, simply rest the

beam on a pair of horses, and position the saw between the tables. (The guide rails straddle the beam to keep the extension tables aligned with the saw.) For longer cuts, slide the saw to one end of the beam, and position the tables side by side. Locking the tables to the T-track allows them to extend beyond the ends of the beam, which can be a

Figure 1: Mittersaw Station Exploded View



big advantage when trimming the ends of heavy posts, and when supporting long, narrow stock, like crown molding.

In addition, the torsion beam has plenty of uses by itself. It can serve as an assembly table (the lipped edges provide toeholds for clamps) or as a sturdy table for other benchtop tools. When not in use, the station can be stowed away, as shown on page 50. (I made this beam 6 1/2' long to better suit smaller shops and to fit into the bed of my pickup truck. If your shop has the space and you expect that the beam will stay put, consider making it 8' long.)

Make the torsion-beam base

1 Cut the top, bottom (A) and sides (B) to the dimensions listed in the **Cut List**. (I tacked the matching parts together with pin nails and cut them in a single pass. Stack-cutting ensures that the parts are identical, even if your measurements are a little off.) Note that the long edges of the strips must be parallel. To ensure this, I cut the parts to rough width with a circular saw and then used my tablesaw to rip to final width.

2 Using a handheld router outfitted with a 1/2" straight bit and edge guide, rout the grooves in the top and bottom

(A), where shown in **Figure 1**. (I set the bit slightly less than 1/4" so that 1/2" of stock remained after routing the groove. Doing this will result in a 6"-high beam, an easy to remember dimension should the beam be used for future fixtures.)

3 Break the long edges of the sides (B) with sandpaper, and then fit the sides into the top and bottom (A). Stagger the parts slightly, as shown in **Photos A and B**, and then use clamps to draw the assembly together. Next, cut the ribs (C) oversize, and then use the dry-assembled beam to determine the exact size of the ribs.



Clamp the top and bottom to the sides, and then set an oversized rib in the open end. Use a square to determine its exact length and height.



4 Mark the rib locations, where shown in **Figure 1**, on the inside face of the top (A), and the rib centerlines on the outside face of the bottom. Next, drill three pocket holes along a long edge of each rib (C).

5 Position the top (A) face down, apply glue to the grooves (I used Titebond Extend for extra working time), and insert the sides (B). Brush glue onto the top edges and both ends of the ribs (C), and then screw them to the top with 1¼" pocket screws (**Photo C**). Next, apply glue to

the bottom edges of the sides and ribs, position the bottom onto the sides, and clamp the beam assembly together.

6 Flip the beam upright, and then attach the bottom to the ribs with 2½"-long PowerHead screws (**Photo D**). (Note: PowerHeads are designed for hanging cabinets, but I like the way the hardened shanks and large washer heads pull parts together without snapping or sinking into the material.)

7 Lightly chamfer any sharp edges using a router or

sanding block, and then put the beam aside for now.

Make the saw base and extension tables

1 Using your saw as a guide, make a ¾"-thick plywood saw base (D) 2" longer and at least 2" deeper than the saw. (Note: The plywood base must be at least 15" deep to ride the beam. If the depth of your saw's base is greater than 13", increase the plywood depth to suit.) Next, center the saw on your base, and lay out the locations of the attachment holes. Drill

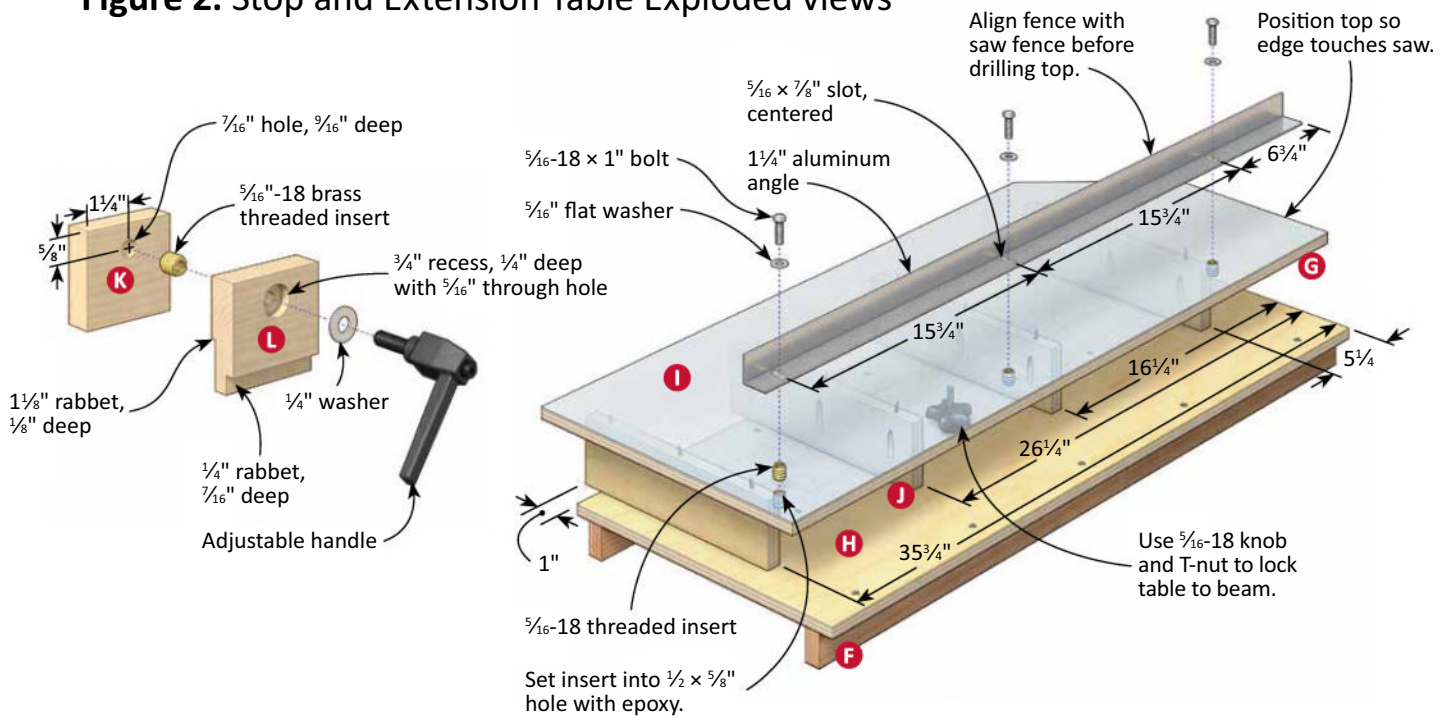


Screwing the ribs to the underside of the torsion beam's top ensures that the ribs stay put when you add the bottom panel.



Starting at one end, use clamps to pull the bottom tight to the sides, and then screw the bottom to the ribs using PowerHead screws.

Figure 2: Stop and Extension Table Exploded views



the counterbores and through holes, and then attach the saw.

2 Referring to the **Cut List**, prepare enough $\frac{3}{4}$ " stock to make saw base and extension table guide rails (E, F). Cut the saw base guide rails to length. Next, position the saw and saw base (D) onto the torsion beam so that the base's front edge extends over the top by $1\frac{1}{2}$ ", and attach the front guide rail. Now install the rear guide rail. Aim for a snug fit, as slop may compromise the station's cutting accuracy.

3 Cut the extension table tops (G) and bottoms (H) from $\frac{3}{4}$ " and $\frac{1}{2}$ " plywood.

4 Cut the plastic laminate (I) 1" longer and wider than

the tabletops (G). Roll contact cement onto the back face of the laminate and the top face of the table. After the cement tacks up, lay dowels across the table, center the laminate, and then press it in place, working outward from the center. (For more info, see the "Compact Router Table," page 52) Press the laminate to the top using a laminate roller or bullnosed board to ensure a good bond. Finally, use a bevel trim router bit to rout the laminate flush.

5 To determine the exact width of the risers (J), clamp a laminated tabletop (G, I) and bottom (H) to your torsion beam, set your saw alongside the stack

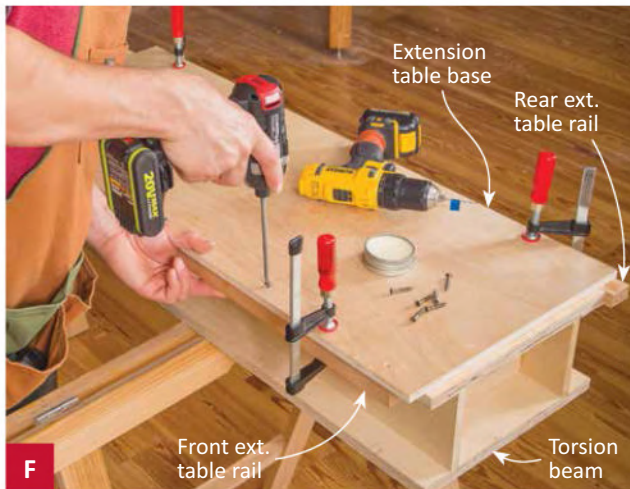
and set a square on your saw's base, as shown in **Photo E**.

6 Cut the extension table guide rails (F) to length, and then attach them to the extension table bases (I). To ensure that the base is centered on the



Position your extension table top and bottom next to your saw, and use a combination square to determine the exact width of the table risers.

This station is designed to fit a 12" DeWalt sliding compound mitersaw, one of the largest saws in this category. If you own a smaller saw, you can adjust the depth of the extension tabletops to reduce weight and save material. For example, if you're mounting a conventional non-sliding 10" mitersaw with a crosscut capacity of about 6", simply add 2" (for fence mounting) to arrive at an 8" width for the extension tabletops.



Clamping a rear guide rail flush with the base when installing the front rail centers the base on the beam.



Pocket-screwing the risers to the underside of the saw table top ensures a smooth, seamless work surface.

beam, clamp a rear rail on the flat to the rear edge of the base with the part edges aligned. Then clamp the front rail and screw it in place with 1½"-long screws (**Photo F**). Next, flip the rear guide rail on edge, press it against the beam, and attach it to the base. Repeat the process with the second base and rails.

7 Fasten your saw to the saw base (D), and set it on the torsion beam. Now stack the extension tabletops (I) on the risers (J) and bases (H) to determine the miter angles on the inner ends of the tops. Then cut them.

8 Referring to **Figures 1 and 2**,

lay out the riser (J) locations on the bottom face of the extension tabletop (I). Drill pocket hole screws in the top edge of each riser, and then attach the risers (J) to the extension tabletops using 1¼"-long screws (**Photo G**).

9 Rout a ¾ × ½"-deep groove in the center of the top (A). Next, affix the T-track into the groove using epoxy and #6 × ½" screws.

10 Position the extension table bases (H, F) on the torsion beam, and then position the tabletop and riser assembly (G, H, I, J) alongside your miter saw. Position each extension table

so that 2" extends behind your saw's fence, and then clamp the top to the base. Flip the extension table assembly over, and mark lines on the risers to record the bottom's position on the ends of the risers. Lay out and drill ⅝" holes for the T-bolts between the risers. Finally, fasten the base to the risers with glue and 2½"-long PowerHead screws (**Photo H**).

Add the fences and make the stops

1 Saw two pieces of ⅛"-thick aluminum angle to length. Next, lay out three ⅝ × ⅞"-long slots, where shown in **Figure 2**.

To drill the ends of the slots, dimple the centerpoints with a punch, and then set up your drill press fence to bore a ⅞" starter hole. Now install a fresh ⅝" bit, and drill through the starter holes, as shown in **Photo I**.

2 Using a jigsaw outfitted with a metal-cutting blade, saw out the material between the holes (**Photo J**), and then use a file to work up to your layout lines.

3 Using a level or other reliable straightedge, line up an aluminum fence on one side of the saw, and mark the slot locations on the saw table



Complete the extension tables by attaching the bases to the risers with 2½" PowerHead screws.



I Clamp the aluminum angle securely to your drill press table, and lubricate the bit for clean, straight holes.



J To be safe, saw on the inside of your line and finish up with a file.

top (G), as shown in **Photo K**. Drill a $\frac{1}{2} \times \frac{5}{8}$ "-deep hole in the center of each slot. Repeat on the opposite side of the saw.

4 Apply a generous coat of wax on the threads of the $\frac{1}{4}$ " bolts, and then screw them into the $\frac{3}{8}$ " threaded inserts. Test-fit the insert and bolt in the hole. (Adjust the bolt so that its tip causes the insert to sit $\frac{1}{16}$ " below the surface.)

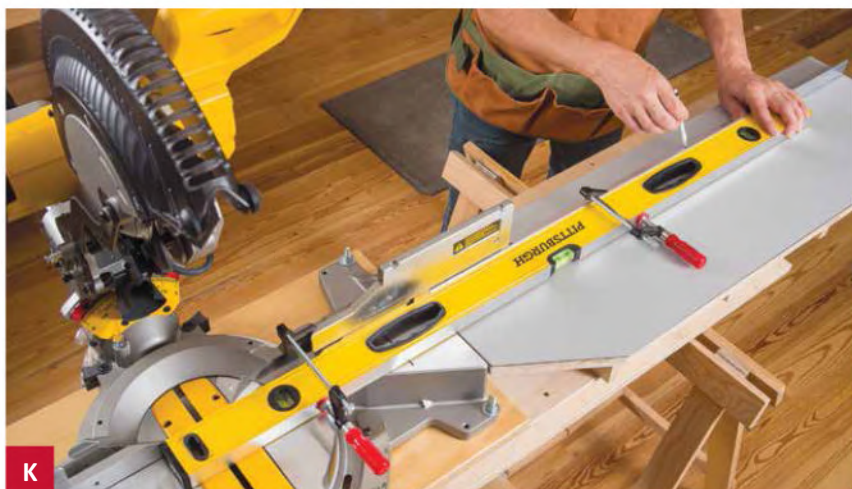
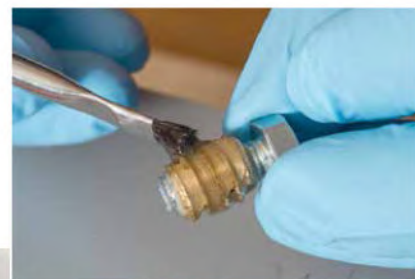
5 Mix up enough epoxy for two or three holes. Put some epoxy in the hole, brush a little on the insert threads (**Photo L**), and then press an insert into the hole. Set the other inserts before

the epoxy sets. Now repeat the process with the remaining holes. (Note: As you set the insert, a little excess epoxy should ooze out. This excess is easiest to pare away when the epoxy starts to harden, but before it completely sets.) When the epoxy cures, attach the fences to the extension tables with washers and bolts.

6 To make the stops, cut two blanks, one at $\frac{3}{4} \times 2\frac{1}{2} \times 8$ " for the fronts (K), and one at $\frac{3}{4} \times 2\frac{3}{8} \times 8$ " for the backs (L). (The blocks are initially longer than needed for safer machining.) Use your tablesaw and standard blade to make the $1\frac{1}{8} \times \frac{1}{8}$ "-deep

rabbet on the inner face of the back stop. To make the $\frac{1}{4} \times \frac{7}{16}$ " rabbet needed to clear the bolt heads holding the fence to the table, you can make a few passes with your saw, or set up a table-mounted router with a straight bit. Now cut the parts to length.

7 Using a drill press equipped with a fence and stops (the holes in the front and back



K Clamp a level to the saw's fence and aluminum angle to align the two, and then mark the slot location on the extension table.



L Sinking threaded inserts into epoxy-filled holes is an easy way to ensure a tight fit without the risk of messing up the top of the insert.

sections must line up), drill the counterbores in the back portion of the stops, followed by the $\frac{5}{16}$ " through hole. Next, switch to a $\frac{7}{16}$ " bit, and drill the stopped holes in the front half.

8 Insert threaded inserts into the stop fronts (K), sinking them slightly below the surface, and then assemble the stops, as shown in **Figure 1**. Clamp the stops to the aluminum angle fences when they're needed. Stash them in the space under the extension tables when they're not.

9 To assemble your mitersaw station, first position your saw on the beam. Next, insert T-bolts into the bottoms of the extension tables, fit the heads into the T-track, and slide the tables in place. Attach the knob to the T-bolt to secure it to the torsion beam. Using a level, check that the aluminum fences are parallel with the saw fence, and that the saw table is aligned with the extension tables. Shim or shift as needed, and then start cutting. ■



Torsion Beam Mittersaw Station

	Part	Thickness	Width	Length	Qty.	Mat'l
A	Top and bottom	$\frac{3}{4}$ "	12"	78"	2	BP
B	Sides	$\frac{1}{2}$ "	5"	78"	2	MDF
C+	Ribs	$\frac{3}{4}$ "	5"	7"	9	BP
D+	Saw base	$\frac{3}{4}$ "	16 $\frac{1}{2}$ "	27"	1	BP
E+	Saw base guide rails	$\frac{3}{4}$ "	1 $\frac{1}{2}$ "	16 $\frac{1}{2}$ "	2	C
F	Extension table guide rails	$\frac{3}{4}$ "	1 $\frac{1}{2}$ "	37 $\frac{1}{2}$ "	4	C
G+	Extension tabletops	$\frac{3}{4}$ "	12"	39 $\frac{1}{2}$ "	2	BP
H	Extension table bases	$\frac{1}{2}$ "	15"	39 $\frac{1}{2}$ "	2	BP
I*	Facings		12"	39 $\frac{1}{2}$ "	2	PL
J+	Extension table risers	$\frac{3}{4}$ "	3"	11"	8	BP
K	Stop fronts	$\frac{3}{4}$ "	2 $\frac{3}{8}$ "	2 $\frac{1}{2}$ "	2	M
L	Stop backs	$\frac{3}{4}$ "	2 $\frac{1}{2}$ "	2 $\frac{1}{2}$ "	2	M

+Depending on or saw, actual dimensions may differ from those listed.

See instructions.

*Indicates that parts are initially cut oversized. See instructions.

Materials: BP=Birch Plywood, MDF=Medium Density Fiberboard, C=Cherry, PL=Plastic Laminate, M=Maple

Hardware/Supplies: (4) $\frac{5}{16}$ -18 $\times$ 2 $\frac{1}{2}$ " bolts; (4) $\frac{5}{16}$ -18 nuts; (8) $\frac{5}{16}$ $\times$ 1" washers; #6 $\times$ 1" flathead screws; #8 $\times$ 1 $\frac{1}{4}$ " pocket screws; $\frac{1}{8}$ $\times$ 1 $\frac{1}{4}$ $\times$ 96" aluminum angle; (6) $\frac{5}{16}$ " flat washers, (6) $\frac{5}{16}$ -18 $\times$ 1" bolts.

Convenience-PLUS BUYING GUIDE

☐ 1.	Titebond Extend Wood Glue, 16 oz.	#140441	\$7.99
☐ 2.	10-2 $\frac{1}{2}$ " PowerHead wood screws	#834205	\$15.50
☐ 3.	Freud 12-116 Double Flute Straight Router Bit, $\frac{1}{2}$ " SH, $\frac{1}{2}$ " D, 1" CL	#834230	\$18.47
☐ 4.	Kreg $\frac{1}{4}$ " Mini T-Track, 48" (2 needed)	#149083	\$18.99
☐ 5.	Titebond GREENchoice Neoprene Plus Contact Cement, Clear, QT	#152933	\$22.50
☐ 6.	Freud 41-102 15° Bevel Trim Router Bit, $\frac{1}{4}$ "SH, $\frac{19}{32}$ "D, $\frac{9}{32}$ "CL 15°	#828884	\$28.97
☐ 7.	Brass Threaded Insert, $\frac{5}{16}$ "-18 (8/package, 8 needed)	#159291	\$6.99
☐ 8.	System Three 5-Minute Epoxy, $\frac{1}{2}$ pint	#124270	\$22.99
☐ 9.	Adjustable Handle with $\frac{5}{16}$ "-18 $\times$ 1" stud (2 needed)	#129132	\$5.29
☐ 10.	T-Bolts, $\frac{5}{16}$ -18 $\times$ 2- $\frac{1}{4}$ " (10/package, 2 needed)	#130438	\$11.99
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As seen in this
issue of *Woodcraft*
Magazine's
Work Shop Story





Compact Router Table

Easy to make; accurate to use

By Paul Anthony

Overall dimensions:
28"w x 22"d x 14¼"h

Having a router, but no router table, is akin to owning a Ferrari that never leaves the downtown streets. You're simply not using your tool anywhere near its capacity. A table-mounted router is capable of all sorts of operations that would be difficult or impossible to perform with a handheld router. And it's often safer, too. (So much for the Ferrari analogy.)

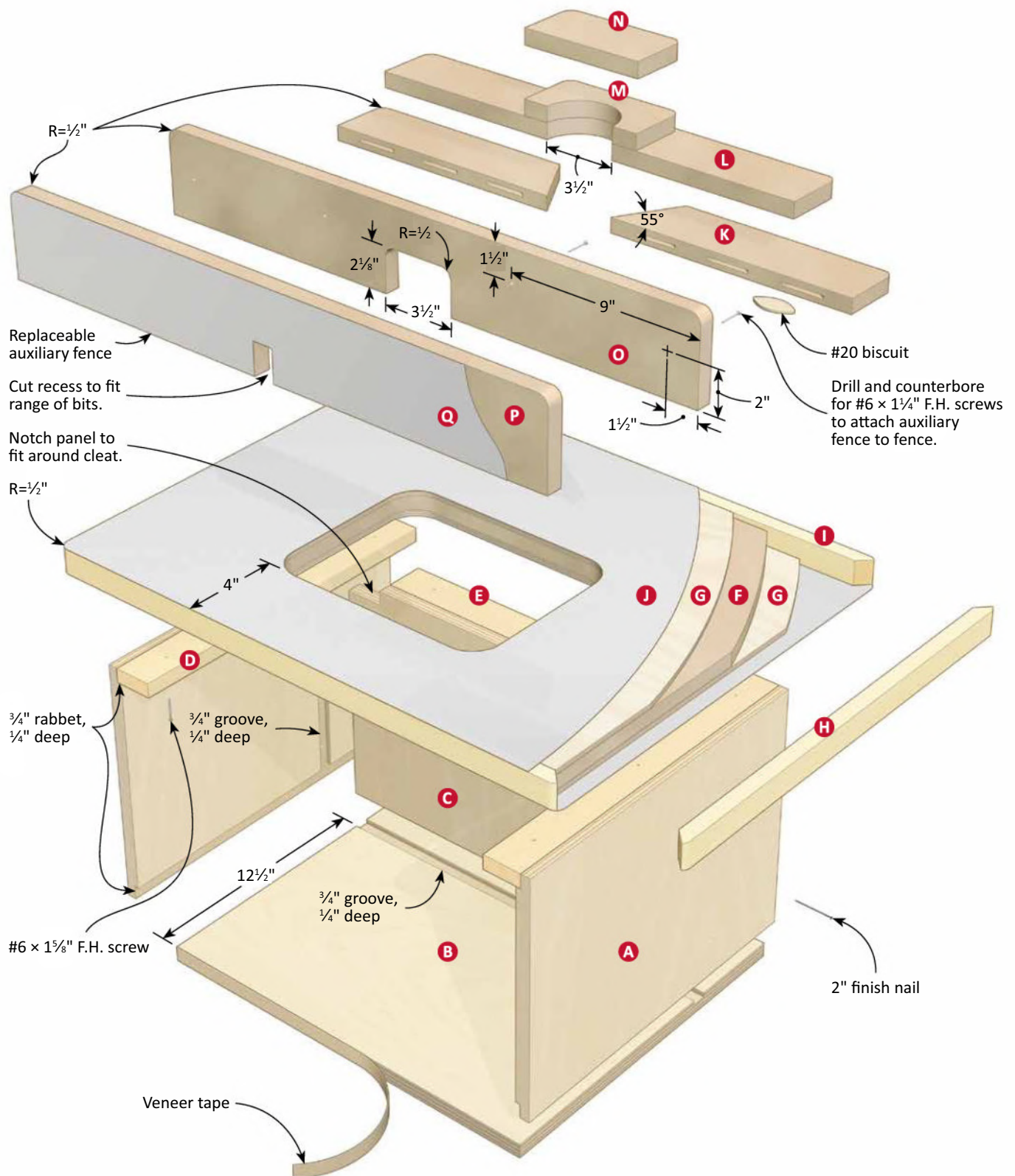
A good router table doesn't have to be fancy—just accurate and friendly to use. Here is a

solid, compact version that will serve without flinching in any space-challenged shop. The H-shaped understructure ensures that the top stays flat, and offsetting the insert plate toward the front of the table prevents user back strain and increases accessibility for router adjustments. (When more support surface is needed for panels or other wide pieces, you can work from the rear of the table.) A generous overhang allows for easy clamping of

the fence, featherboards, and stop sticks. I omitted a miter gauge track because I seldom need one and prefer to keep the tabletop free of recesses that trap chips. That said, you can certainly add one if you like.

Finally, the no-frills fence shown here is accurate, easy to use, and quick to build because it doesn't have an adjustable split fence or a dust port. If those features are important to you, see the Router Table Fence article in Issue #36.

Figure 1: Router Table and Fence Exploded View





A

To rout the grooves in the sides and bottom, gang them together, and set up a straightedge to guide the router.

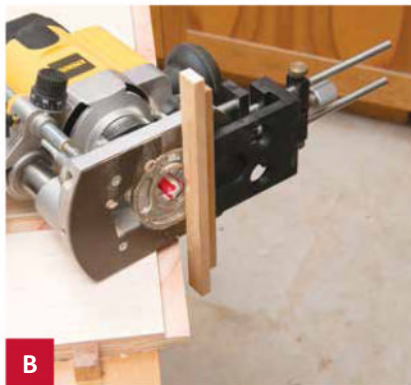
Make the plywood base

1 Saw the sides (A), bottom (B), and center panel (C) to the sizes in the **Cut List**, except leave the center panel about $\frac{1}{8}$ " slightly oversized in width (height) for now. Also, mill the cleats (D, E) to size.

2 Lay out the rabbets and groove on each side (A) and the groove on the bottom (B). Then rout the grooves in the sides and bottom, as shown in **Photo A**.

3 Outfit your router with an edge guide to cut the rabbets in the sides (A), making sure that their width exactly matches the thickness of your cleats (D). Then rout the rabbets (**Photo B**).

4 Fit the sides (A), bottom (B), and center panel (C) together, clamp a side cleat in place, and



B

To rout the rabbets in the sides, outfit an edge guide with a sacrificial fence to spare the edge guide fence.

trace around its end (**Photo C**). Then connect the topmost cleat lines to mark the top edge of the center panel. Trim to this outline (which will be important to the flatness of the top), and then saw out the cleat notches.

5 Notch the upper corners of the center panel (C) to accept the cleats (D).

6 Glue and nail the bottom (B) to the center panel (C). Then attach the sides (A), also with glue and finish nails.

7 Glue and clamp the side cleats (D) into their rabbets. Then attach the center cleat (E) to the center panel (C). Finish up by applying veneer tape to the front and rear edges of the case.



C

Trace around the end of a cleat to mark out the top edge of the center panel, as well as the cleat notches.

Make the top

1 Referring to the **Cut List**, saw the core (F) and outer panels (G) slightly oversized. You'll trim them to final length and width after gluing them together.

2 To prepare for the glue-up, make four thick clamping cauls long enough to span your tablesaw top.

3 Use a roller to apply an even coat of glue to one face of the core (F) and one face of an outer panel (G). Then clamp the assembly to your tablesaw top (or other dead-flat surface) with the outer panel underneath the core (**Photo D**). After the glue cures, attach the opposite panel in the same manner, and then saw all four edges of the assembly (F, G) to bring it to the size in the **Cut List**.

4 Mill the edging (H, I), making the pieces about 1" longer than the sizes in the **Cut List** and $\frac{1}{16}$ " wider than the thickness of the top.

5 Dry-fit the edging to the top, mitering the ends to meet neatly at the corners (**Photo E**). Then glue the edging in place, applying plenty of glue to the porous MDF. I first glue both long pieces in place, using the dry-fit shorter pieces for alignment purposes. After the glue cures, I attach the shorter pieces.

6 Trim the edging flush to the panels with a block plane.

7 Referring to the **Cut List**, saw the plastic laminate at

Tip Alert

Plastic laminate scraps are often available inexpensively from cabinet shops. A solid, light color is usually best for woodshop fixtures.



D

Apply glue, and then place the 1st outer panel under the core, applying pressure via clamping cauls. After an hour, attach the 2nd outer panel in the same manner.

least 1" oversized in width and length. While you're at it, cut the auxiliary fence facings (Q), again making them oversized. Also, have at the ready three ½"-diameter dowels at least 24" long, as well as a laminate roller or bullnose-edged board for pressing the laminate into place.

8 Spray, brush, or roll contact cement onto one of the laminate sheets and one face of the top. After the cement tacks up, lay the dowels across the top, and then center the laminate over the panel and press it into place,

as shown in **Photo F**. Follow up by using the laminate roller or bullnosed board to firmly press the laminate into the cement.

9 Rather than using a straight flush-trim bit, use a bevel trim router bit to rout the laminate flush to the edging while slightly beveling the laminate edges at the same time.

10 Clamp the top vertically in your bench vise, and rout the corners with a ½" round-over bit, as shown in **Photo G**. Follow up by routing the edges with the bevel trim bit.



F

To apply the laminate in a controlled fashion, slowly pull out the centermost dowel separator while pressing the laminate down against the top.



E

Cross-clamp two adjacent pieces of edging with their miters touching, and mark the opposite ends to length.

Install the insert plate and attach the top

1 Check both faces of the top with a good straightedge. If there is any slight crown, make that your top face. Locate the insert installation template (see the buying guide) on the router tabletop to lay out the opening, where shown in **Figure 1**. Trace the opening onto your top.

2 Remove the template, and use a jigsaw to cut to within ⅛" of your layout line.

3 Clamp the template to the router tabletop, and outfit your



G

When rounding over the corners of the top, clamp a thick backer to the exit side of the cut to prevent blow-out and provide router support.



H

Having roughed out the opening with a jigsaw, clamp the insert installation template in place, and rout to the template edges using a pattern-routing bit.

router with a pattern-cutting bit. Then rout the opening perimeter. I clamped the top to a couple of plywood I-beam risers to do the job, as shown in **Photo H**.

4 With the top inverted, install the insert plate levelers according to the manufacturer's instructions, screwing them to the underside of the top at the corners of the opening (**Photo I**).

5 With the inverted case centered on the underside of the top, drill pilot holes and clearance holes through the cleats (D, E), and attach the top with $1\frac{5}{8}$ " $\times$ #6 coarse-thread screws.

6 Remove your router's subbase, and attach the tool to the insert following the manufacturer's instructions.



I

Screw the insert plate levelers to the underside of the table top. Each is outfitted with two set screws for leveling the plate and one flathead screw for securing it down.

Make the fence

1 Saw the 1st layer (K) to $3\frac{1}{8}$ " long $\times$ 28" wide for now. Saw the 2nd and 3rd layers (L, M) and cap (N) to the lengths shown in the **Cut List**, but leave them about $\frac{1}{8}$ " oversized in width for now.

2 Rout what will be the rear corners of all the pieces using a $\frac{1}{2}$ "-radius round-over bit. Gang-rout the pieces by aligning them at one end, including a piece of scrap to prevent exit tear-out. Clamp them together, mounted in a vise, and rout the corners all at once. Then align the pieces at the other end, and repeat (**Photo J**).

3 Lay out a $1\frac{3}{4}$ "-radius arced notch on the 3rd layer (M), where shown in **Figure 1**.

4 Glue and clamp the 3rd layer (M) to the 2nd layer (L), centering the two pieces along their length and keeping their edges aligned. After the glue dries, cut out the arced notch with a bandsaw.

5 Lay out and cut the 55° mitered center section from the 1st layer (K). Then glue and clamp the two outer sections and the cap (N) to the 2nd/3rd layer assembly (**Photo K**).

6 After unclamping the assembly, check its rear edge for layer alignment. If necessary, trim the least amount at the tablesaw to create a dead-straight rear edge. Then rip the front face to bring the assembly to a final 3" width.

7 Saw the fence (O) and auxiliary fences (P) to the sizes shown in the **Cut List**. Clamp the pieces together in alignment, and then round over what will become the top corners. For router support and blow-out prevention, use the same backup block shown in **Photo G**.

8 Lay out the opening in the fence (O), where shown in **Figure 1**, and then bandsaw it out.



To rout the rear corners of the fence layers and cap, gang them together, aligning them first at one end, and then the other.

9 Lay out and cut the #20 biscuit slots in the 1st layer (K) and the mating slots in the rear face of the fence (O).

10 Glue the fence to the layers-and-cap assembly (K-N), inserting biscuits in the slots. Make sure that the 1st layer (K) and fence (O) are dead square to each other under clamp pressure.

11 Saw two auxiliary fence facings (Q) about 1/2" wider and longer than the size shown in the **Cut List**. Use contact cement to apply a facing (Q) to each auxiliary fence (P), and then rout the laminate flush to the edges of the fences.

12 Notch an auxiliary fence to accommodate your desired range of bit sizes. (A 1"-wide × 1 1/2"-high opening will serve well for smaller bits.) Notch the other auxiliary fence as needed, perhaps using it for larger bits.

13 Attach the auxiliary fence with four #6 × 1 1/4" screws driven through counterbored clearance holes in the fence, where shown in **Figure 1**. ■



Rehearse your glue-up, pre-setting your clamps and using a straight, squared length of back-up stock to keep the pieces aligned.

Router Table Cut List

	Part	Thickness	Width	Length	Qty.	Mat'l
A	Side	3/4"	18"	13"	2	BP
B	Bottom	3/4"	18"	21"	1	BP
C*	Center panel	3/4"	12 1/2"	21"	1	BP
D	Side cleats	3/4"	2"	18"	2	SW
E	Center cleat	3/4"	2"	17"	1	SW
F*	Core	3/4"	20 1/2"	26 1/2"	1	MDF
G*	Outer panels	1/4"	20 1/2"	26 1/2"	2	BP
H*	Edging (sides)	3/4"	1 1/4"	22"	2	SW
I*	Edging (front & back)	3/4"	1 1/4"	28"	2	SW
J*	Facings		22"	28"	2	PL

Router Fence

K*	1 st layer	3/4"	3"	12 1/4"	2	MDF
L*	2 nd layer	3/4"	3"	22"	1	MDF
M*	3 rd layer	3/4"	3"	6"	1	MDF
N*	Cap	3/4"	3"	6"	1	MDF
O	Fence	3/4"	4"	28"	1	MDF
P	Auxiliary fence	3/4"	4"	28"	2	MDF
Q*	Auxiliary fence facing		4"	28"	2	PL

*Indicates parts that are initially cut oversized. See instructions.

Materials: BP=Birch Plywood, MDF=Medium Density Fiberboard, SW=Solid Wood, PL= Plastic laminate

Convenience-PLUS BUYING GUIDE

☐ 1.	Freud 41-102 Bevel Trim Router Bit 1/4" SH 19/32" D 9/32" CL 15°	#828884	\$28.97
☐ 2.	Kreg Blank Precision Router Table Insert Plate	#158287	\$59.99
☐ 3.	Kreg Precision Router Table Insert Plate Levelers	#148873	\$19.99
☐ 4.	Woodpeckers Router Table Insert Installation Template	#150996	\$14.99
☐ 5.	CMT 812.690.11B Pattern Router Bit 1/2" SH, 3/4" D, 1 1/2" CL, 3 1/4" OL, 3/4" BD	#817519	\$36.99

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☐ 6.	Bosch 1617EVSPK 12 Amp 2 1/4-HP Plunge and Fixed Base Variable Speed Router Kit with 1/4"-Inch and 1/2"-Inch Collets	\$219.00
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A Trio of Benchtop Carts

Give your tools a mobile home.

By Bill Sands

One of the secrets to a fully functional benchtop shop is to have an array of mobile carts that suit the tools you own. You should be able to move them out from the wall for service and roll them back when not in use. They should offer built-in storage and let the woodworker conveniently perform a variety of machining tasks at a safe and acceptable height. The three related carts shown here are a perfect fit for a benchtop router table, bandsaw,

drill press, planer, and jointer as the photos above illustrate. While the 2 × 2' carts (the short and standard size designs) feature handy drawers for storing bits and accessories, the larger 2 × 4' cart comes with shelf space for housing larger items. Here, I'll show how to build the standard-height 2 × 2' cart. Apply the same approach to construct the other two carts using the figures and dimensions in the **Cut List**.

Overall dimensions:

Large cart, 48"w × 24"d × 32"h

Standard cart, 24"w × 24"d × 20"h

Short cart, 24"w × 24"d × 32"h

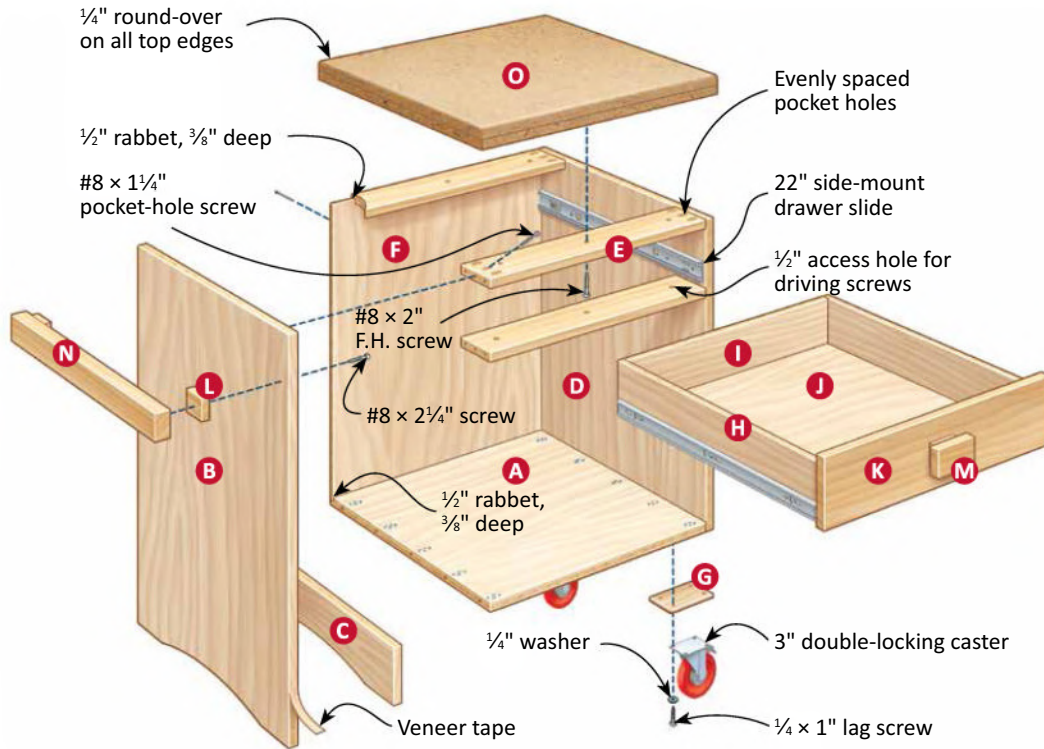
Start with a sturdy case

1 Set up a pair of sawhorses and spread out four 2 × 4 studs on the horses. Place a sheet of plywood (I used birch) on the 2 × 4s. Now, lay out the part

Tip Alert

To reduce splintering when crosscutting plywood, cover the cutline with painter's tape after setting up for the cut.

Figure 1: Standard 2 × 2' Cart Exploded View



widths for the case bottom (A), long side (B), long side cleat (C), short side (D), and cleats (E), using the dimensions in the **Cut List** for the standard 2 × 2' cart.

2 To begin breaking down a full-size sheet, position 2 × 4s on each side of the rip line to provide support. Clamp a straightedge or ripping jig in place on the sheet, and then rip the plywood to width using a circular saw, as

shown in **Photo A**. (To make a custom ripping jig for your saw, attach an 8' straight fence piece to a 1/8"-thick hardboard base. Run your saw along the fence to establish the width between the blade and the edge of the saw's baseplate. Align this edge of the jig with the cutline when breaking down sheet goods.)

3 Referencing the **Cut List**, lay out the part lengths on

the ripped sheet goods and cut the case bottom (A), long side (B), long side cleat (C), short side (D), and cleats (E) to length (**Photo B**).

4 Using a handheld router, rabbeting bit, and straightedge, cut a 1/2" rabbet, 3/8" deep, on the top back edge of the case bottom (A) and on the bottom back edge of the upper rear cleat (E). The back will fit into them later.

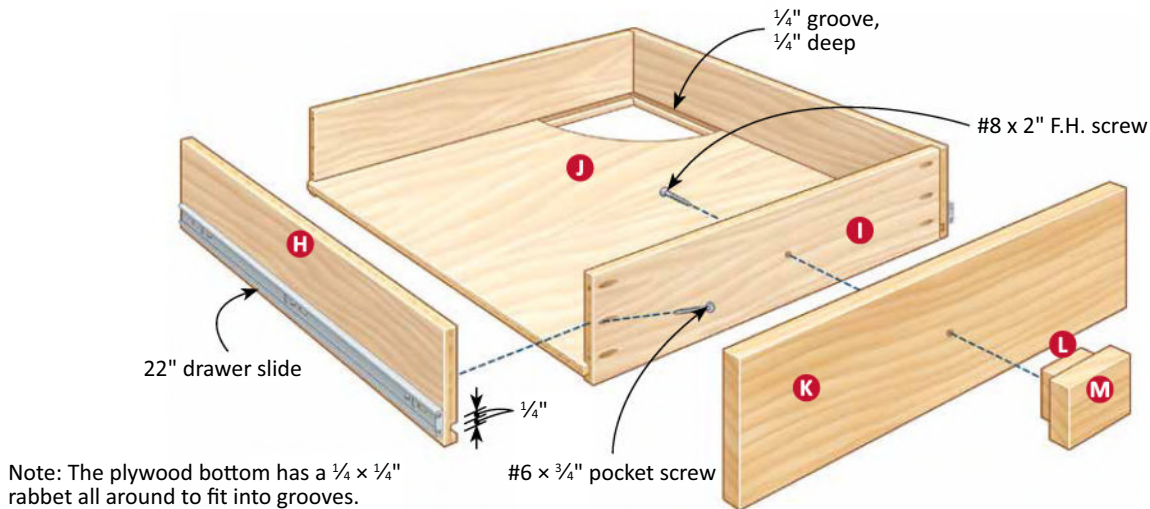


A Clamp the ripping jig along the cutline, and saw the plywood to width.



B Employ a circular saw guide or clamped-in-place straightedge to accurately crosscut the case parts to length.

Figure 2: Drawer Exploded View



Note: The plywood bottom has a $\frac{1}{4} \times \frac{1}{4}$ " rabbet all around to fit into grooves.

5 Apply adhesive-backed edge banding on to the front edges of the sides (B, D) with an iron. Trim the edges. (See the wall cubbies story on page 66.)

6 Glue and clamp the long side cleat (C) to the bottom end of the long side (B), flushing the edges and ends. Let dry.

7 Referencing **Figure 1**, lay out the arch for the feet at the bottom end of the long side (B). (Since I was making several carts, I made a hardboard template for laying out the arches to save time.) Now,

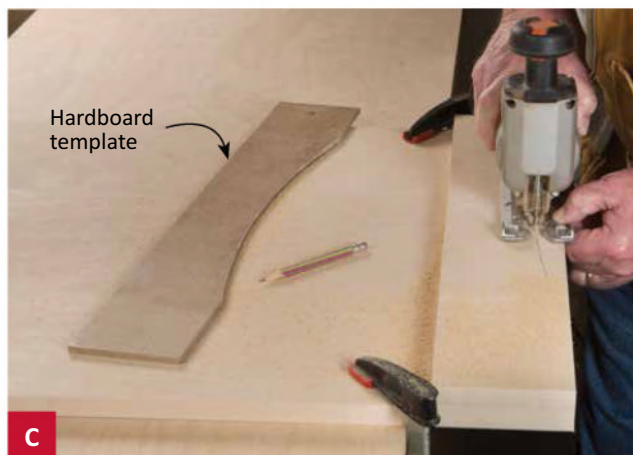
using a jigsaw with a 10-14 TPI wood cutting blade, saw on the line (**Photo C**). Sand the arched edge to remove saw marks and round over the feet.

8 Using a pocket-hole jig, drill five pocket holes on the bottom face of the case bottom (A) at each end for 1 1/4" pocket-hole screws. Drill three pocket holes at each end of the three cleats (E). Drill three 1/2"-diameter access holes 9" apart in the lower cleat (**Figure 1**).

9 Working on a flat surface, screw the bottom (A) to the long

side assembly (B/C) and short side (D), flushing the edges. (See **Figure 1**.) Now, screw on the top cleats (E) pocket holes up (**Photo D**). I clamped a block of wood in place to the side to serve as a temporary ledge on which to rest the cleat when screwing it in place. Finally, add the lower cleat 5" down from the top cleat. To ensure a consistent drawer opening, I used a 5"-long spacer on each side to position the lower cleat. Check the case for square.

10 Measure the opening at the rear of the case from side to



Jigsaw the arch at the bottom end of the long side, taking care that the tool base rests flat on the surface for a straight perpendicular cut.



With the cleat clamped in place and flush to the sides' ends and edges, drive home the pocket screws.

side and from rabbet to rabbet. Cut the $\frac{1}{2}$ "-thick back (F) to fit. Glue and nail it in place.

11 Finally, cut the two caster spacers (G) to the size in the **Cut List**, and glue them to the case bottom (A) (**Figure 1**). Drill pilot holes for $\frac{1}{4} \times 1$ " lag screws. Add washers and screw the 3" casters in place.

Add a basic drawer

1 Cut the drawer sides (H), drawer front and back (I), and drawer bottom (J) to the sizes in the **Cut List**. (Note: The assembled drawer should be equal to the width of the drawer opening minus 1" to allow for the drawer slide hardware.)

2 Rout a $\frac{1}{4}$ " groove, $\frac{1}{4}$ " deep, in the drawer sides (H) and the drawer front and back (I), where shown in **Figure 2**.

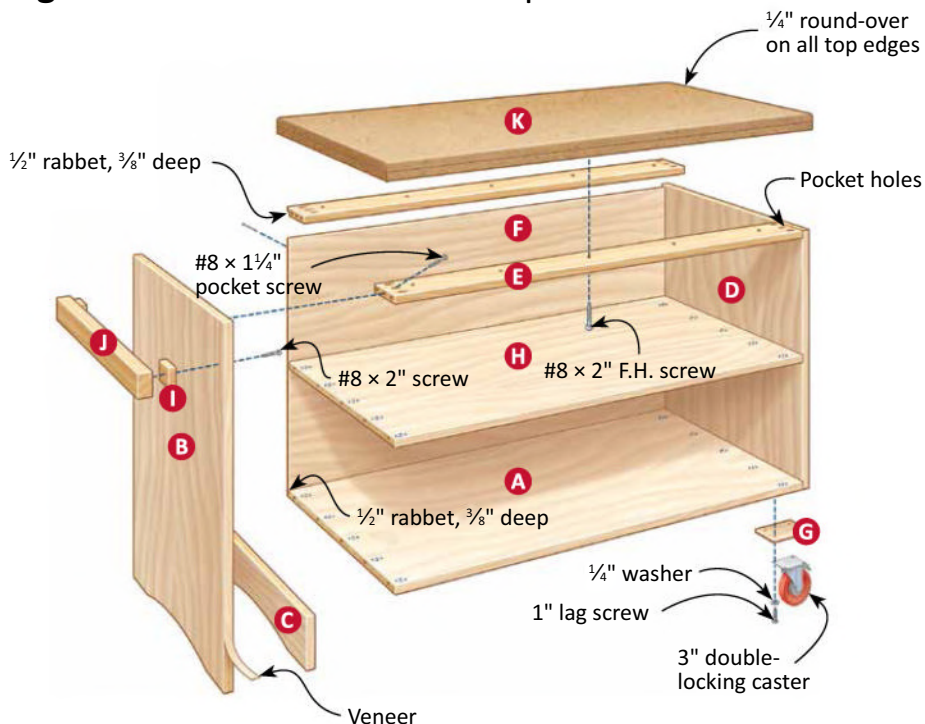
3 Rout a $\frac{1}{4}$ " rabbet, $\frac{1}{4}$ " deep, along the edges of the drawer bottom (J). Test-fit the drawer parts together. Ideally, this can be done at a router table with a $\frac{1}{4}$ " straight bit.

4 Using a micro pocket drill guide for working with thinner stock, drill three pocket holes on the outside faces of the drawer front and back (I) at each end (**Photo E**). Now, slip in the drawer bottom (J), and assemble the drawer box using $\#6 \times \frac{3}{4}$ " panhead screws.

5 Install the drawer slides to the drawer box sides and case sides in the drawer opening. Ensure the box hangs at least $\frac{1}{8}$ " above the lower cleat (E). Test the fit.

6 Measure the drawer opening, and cut the false front (K) from $\frac{3}{4}$ " maple to that measurement minus $\frac{1}{8}$ " in width and length. (You want about a $\frac{1}{16}$ " reveal along the edges and ends.) To keep it simple, I used pennies

Figure 3: Standard 2 × 4' Cart Exploded View



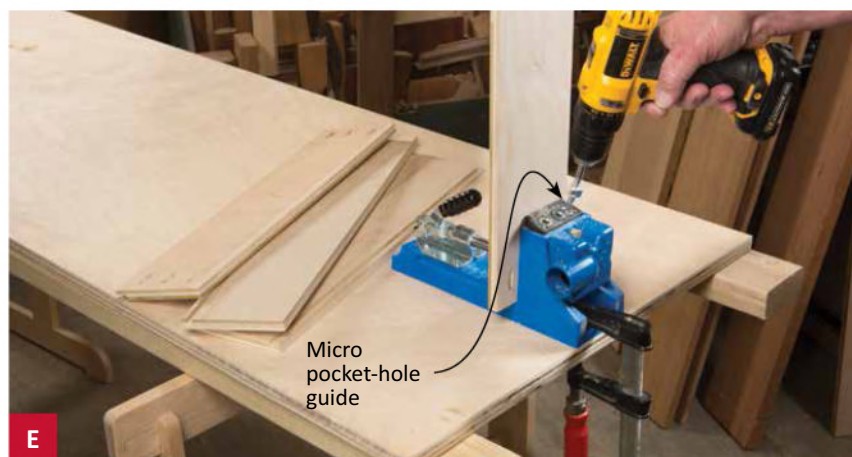
at the bottom and ends of the false front as spacers and then screwed the false front temporarily to the drawer box.

Secure the top, handle, and pulls

1 Cut enough $\frac{3}{4}$ " stock for the pull and handle spacers (L), drawer pull (M), and handle (N), referring to the dimensions in the **Cut List**. Rout a $\frac{1}{4}$ "

round-over on all edges of the pull and handle blank. Now, crosscut the parts to their final lengths. To round over the ends of the pull, do it on a router table while safely holding the piece with a handscrew.

2 Glue the pull and handle spacers (L) onto the pull (M) and handle (N), respectively, centering the spacers across the width of the mating parts. Screw the pull



Fit the micro pocket drill guide into a K3 or K4 Kreg Jig, and use the stop collar and bit that comes with the guide to bore the holes in the thin drawer parts.

(M) to the false front (K) and the cart handle (N) to the long side (B), where shown in **Figure 1**.

3 Cut two $\frac{3}{4}$ "-thick pieces of MDF to the size in the **Cut List** for the top (O). Laminate the two pieces face to face, flushing the edges. Rout a $\frac{1}{4}$ " round-over on the lamination's top edge.

4 Temporarily remove the drawer. Using the access holes in the lower front cleat (E), screw the top (O) to the upper cleats using #8 x 2" flathead screws.

5 Finish-sand the stand. Seal and finish the piece, let dry, and add a benchtop tool. ■

Convenience-PLUS BUYING GUIDE

□ 1.	#153926	\$34.99
Kreg Rip-Cut Circular Saw Guide		
□ 2.	#147423	\$8.99
Birch Edge Banding, White, $\frac{7}{8}$ " x 25'		
□ 3.	#151277	\$139.99
Kreg Jig K4 Master (Pocket-Hole) System		
□ 4.	#149964	\$49.99
Kreg Micro Pocket Drill Guide Kit (for K3 or K4)		
□ 5.	#142246	\$4.69
Kreg Zinc-Coated Pocket-Hole Screws, #8 x $1\frac{1}{4}$ " coarse, 100/pkg.		
□ 6.	#149967	\$4.19
Kreg Zinc-Coated Pocket-Hole Screws, #6 x $\frac{3}{4}$ " fine panhead, 100/pkg.		
□ 7.	#140639	\$19.99
3" Caster, Double Locking, Swiveling w/4 Hole Mounting Plate, (2 needed)		
□ 8.	#160236	\$15.99
HIGHPOINT 3J01 Full Extension Side Mount Drawer Slides, 22", 1pr.		

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Benchtop Carts Cut Lists

	Part	Thickness	Width	Length	Qty.	Mat'l
Standard 2x2' Cart						
A**	Case bottom	$\frac{3}{4}$ "	23 $\frac{1}{2}$ "	22"	1	BP
B**	Long side	$\frac{3}{4}$ "	23 $\frac{1}{2}$ "	30 $\frac{1}{2}$ "	1	BP
C	Long side cleat	$\frac{3}{4}$ "	23 $\frac{1}{2}$ "	4 $\frac{1}{2}$ "	1	BP
D**	Short side	$\frac{3}{4}$ "	23 $\frac{1}{2}$ "	26"	1	BP
E**	Cleats	$\frac{3}{4}$ "	4"	22"	3	BP
F*	Back	$\frac{1}{2}$ "	22"	25 $\frac{5}{8}$ "	1	BP
G	Caster spacers	$\frac{1}{4}$ "	2 $\frac{3}{4}$ "	4 $\frac{1}{2}$ "	2	M
H**	Draw sides	$\frac{1}{2}$ "	4"	22"	2	BP
I**	Drawer front/back	$\frac{1}{2}$ "	4"	19 $\frac{5}{32}$ "	2	BP
J	Drawer bottom	$\frac{1}{2}$ "	20 $\frac{1}{2}$ "	21 $\frac{1}{2}$ "	1	BP
K	False front	$\frac{3}{4}$ "	4 $\frac{7}{8}$ "	21 $\frac{7}{8}$ "	1	M
L	Pull and handle spacers	$\frac{3}{4}$ "	1 $\frac{5}{8}$ "	2 $\frac{1}{4}$ "	3	M
M	Drawer pull	$\frac{3}{4}$ "	2"	3 $\frac{1}{2}$ "	1	M
N	Handle	$\frac{3}{4}$ "	2"	23 $\frac{1}{2}$ "	1	M
O*	Top	1 $\frac{1}{2}$ "	24"	24"	1	MDF
Short 2x2' Cart						
A**	Case bottom	$\frac{3}{4}$ "	23 $\frac{1}{2}$ "	22"	1	BP
B**	Long side	$\frac{3}{4}$ "	23 $\frac{1}{2}$ "	18 $\frac{1}{2}$ "	1	BP
C	Long side cleat	$\frac{3}{4}$ "	23 $\frac{1}{2}$ "	4 $\frac{1}{2}$ "	1	BP
D**	Short side	$\frac{3}{4}$ "	23 $\frac{1}{2}$ "	14"	1	BP
E**	Cleats	$\frac{3}{4}$ "	4"	22"	3	BP
F	Back	$\frac{1}{2}$ "	22"	13 $\frac{5}{8}$ "	1	BP
G	Caster spacers	$\frac{1}{4}$ "	2 $\frac{3}{4}$ "	4 $\frac{1}{2}$ "	2	M
H**	Drawer sides	$\frac{1}{2}$ "	4"	19 $\frac{5}{32}$ "	2	BP
I**	Drawer front/back	$\frac{1}{2}$ "	4"	22"	2	BP
J	Drawer bottom	$\frac{1}{2}$ "	20 $\frac{1}{2}$ "	21 $\frac{1}{2}$ "	1	BP
K	False front	$\frac{3}{4}$ "	4 $\frac{7}{8}$ "	21 $\frac{7}{8}$ "	1	M
L	Drawer Pull	$\frac{3}{4}$ "	2"	3 $\frac{1}{2}$ "	1	M
M	Pull and handle spacers	$\frac{3}{4}$ "	1 $\frac{5}{8}$ "	2 $\frac{1}{4}$ "	3	M
N	Handle	$\frac{3}{4}$ "	2"	23 $\frac{1}{2}$ "	1	M
O*	Top	1 $\frac{1}{2}$ "	24"	24"	1	MDF
Standard 2x4' Cart						
A**	Case bottom	$\frac{3}{4}$ "	23"	46"	1	BP
B**	Long side	$\frac{3}{4}$ "	23 $\frac{1}{2}$ "	30 $\frac{1}{2}$ "	1	BP
C	Long side cleat	$\frac{3}{4}$ "	23 $\frac{1}{2}$ "	4 $\frac{1}{2}$ "	1	BP
D**	Short side	$\frac{3}{4}$ "	23 $\frac{1}{2}$ "	26"	1	BP
E**	Cleats	$\frac{3}{4}$ "	4"	46"	2	BP
F	Back	$\frac{1}{2}$ "	25 $\frac{5}{8}$ "	46"	1	BP
G	Caster spacers	$\frac{1}{4}$ "	2 $\frac{3}{4}$ "	4 $\frac{1}{2}$ "	2	BP
H**	Shelf	$\frac{3}{4}$ "	23"	46"	1	BP
I	Handle spacers	$\frac{3}{4}$ "	1 $\frac{5}{8}$ "	2 $\frac{1}{4}$ "	1	M
J	Handle	$\frac{3}{4}$ "	2"	23 $\frac{1}{2}$ "	1	M
K	Top	1 $\frac{1}{2}$ "	24"	48"	1	MDF

*Indicates parts that are initially cut oversized. See instructions.

**Indicates part/s were joined with pocket-hole screws.

Materials: BP = Birch Plywood, M = Maple, MDF = Medium-Density Fiberboard

Hardware/Supplies: (8) $\frac{1}{4}$ x 1" lag screws; (8) $\frac{1}{4}$ " washers; (6) #8 x 2" flathead screws.

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By Bill Sands



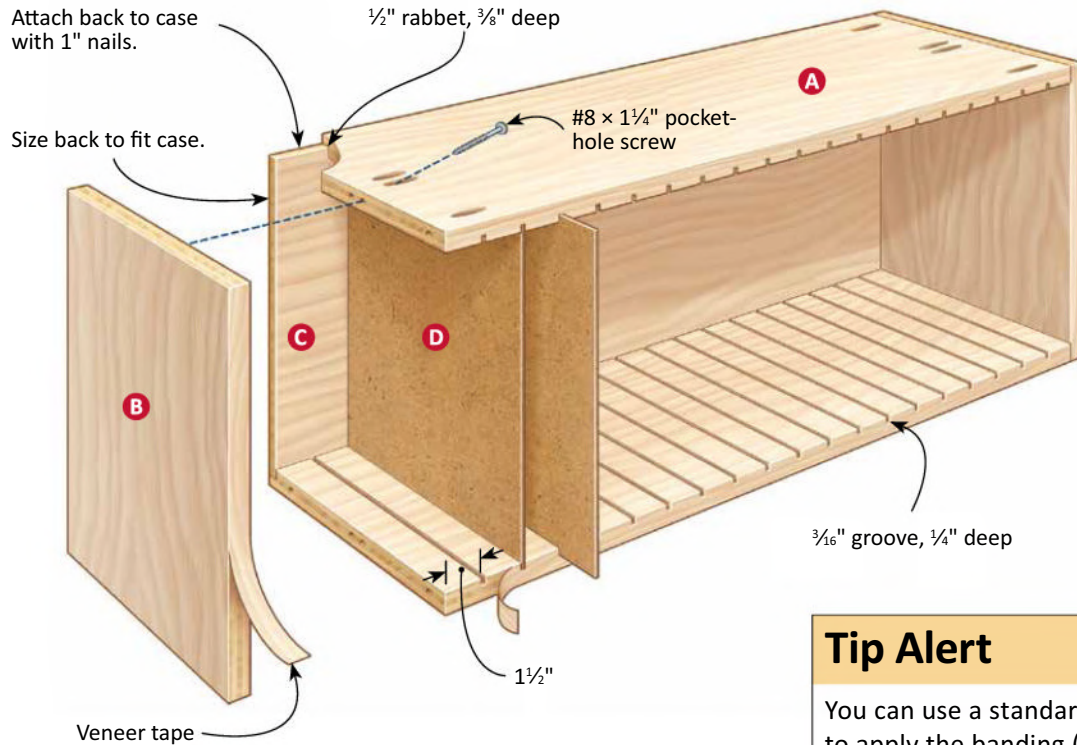
Overall dimensions: 37¼" w × 11¾" d × 13" h

While larger shop machines tend to sit pat until moved by muscle and wheels, smaller tools need persuasion to stay in one spot. At times, drills, nailers, and sanders seem to sprout legs and scramble off as soon as you turn your back on

them. If you've grown weary of playing hide and seek with your portable power tools, corral them with this handy multi-compartment cabinet. It won't take long to build, and even less time to fill. Pocket screws eliminate the need for

fancy joinery or an arsenal of clamps for assembly. Once the case is glued and screwed together, slide the hardboard dividers into the mating dadoes in the top and bottom to create custom storage nooks for tools and related accessories.

Figure 1: Tool Cubby Exploded View



Cut the parts

1 From 3/4" birch plywood, cut the top and bottom (A) and side (B) panels to the sizes listed in the **Cut List**.

2 To cover up the plywood edges on the front of the case, cut the veneer edge banding about 1" longer than you'll

need. Working one edge at a time, set a banding strip onto its mating panel edge. (Note: If you don't own a workbench, try sandwiching the panel between two 2 x 4s, as shown, below right.) After heating the iron just enough to activate, or soften, the adhesive on the

Tip Alert

You can use a standard iron to apply the banding (set it to "medium" or "cotton"); just be sure to clean off any adhesive before returning it to the laundry room.



Press down on the iron and slide it slowly over the banding. For the best bond, continue applying downward pressure with a block until the adhesive cools and hardens.



Clamp a piece of scrap between two panels and then rout the banding with a flush-trim bit.



C Clamp the top and bottom together, and rout the dados for the dividers. The jig's guide strips ensure that the dados are parallel and evenly spaced.



D Use a sanding block to clean up tear-out and to break the edges.

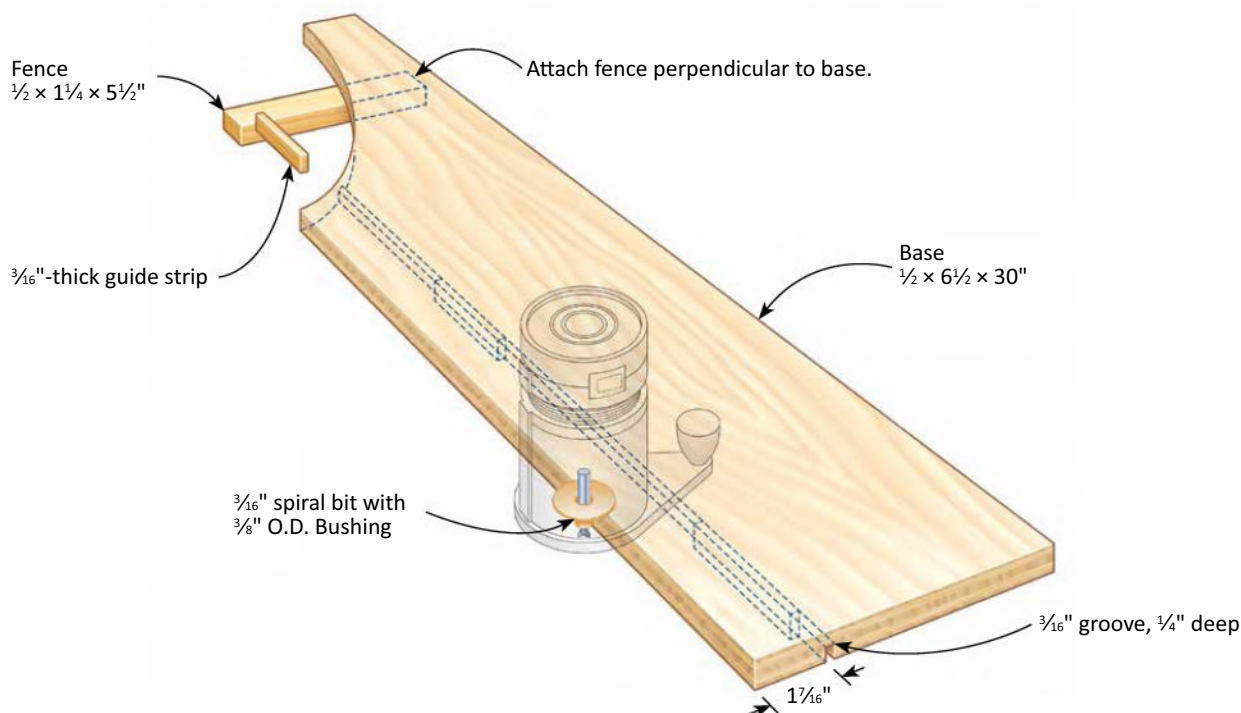
banding's back face, affix the veneer to a front outside edge, as shown in **Photo A**. Repeat the process with the remaining front edges of the panels.

3 Set a pair of panels on edge. Now, using a handheld router outfitted with a flush-trim bit, rout the excess banding, as shown in **Photo B**. Trim the banding ends flush with the panels using a chisel or utility knife. To finish up, lightly chamfer the banding edges with a sanding block to soften the sharp corners, and level any projections that might catch and tear if snagged by a divider.

4 Using a tablesaw equipped with a dado blade, or a router outfitted with a rabbet bit (or else, a straight bit and edge guide), rabbet the rear inside edges of the top and bottom (A), where shown in **Figure 1**.

5 Make the **Dado-Routing Jig** in **Figure 2**. Place the top and bottom (A) front edge to front edge on a benchtop with their

Figure 2: Dado-Routing Jig



Tip Alert

This case offers an opportunity to mix leftover scraps of plywood and MDF. To conceal your frugality, simply paint the case.

inside faces up, flush the ends, and clamp the pieces together. Place the jig at one end of the clamp-up with the guide strips registering against an end, and secure it in place. Using a trim router and $\frac{3}{16}$ " straight bit, rout the first set of dados in the dividers. Next, fit the guide strips into the first set of dados, and rout the next pair of dados. Continue routing (**Photo C**) until you've reached the opposite end. Sand the surfaces smooth (**Photo D**).

Assemble the case

- 1** Referring to **Figure 1**, drill pocket-holes in the outside faces of the top and bottom (A), and then join the top and bottom to the sides (B) with glue and screws.
- 2** Measure the opening at the back of the assembly, and cut the back (C) to fit from $\frac{1}{2}$ " birch plywood. Next, apply glue and insert the back in the cabinet, nailing it in place, as shown in **Photo E**. (To correct a minor bow, I used a clamp to draw the top and bottom to the back panel.)
- 3** Measure and cut the hardboard dividers (D) to fit. (You probably won't need to make dividers for every slot, but I suggest cutting a few more than you think you'll need.)
- 4** Finish-sand the cabinet, and apply a finish as you desire.
- 5** To install the cabinet, screw the back to the wall at the stud locations using #8 x $2\frac{1}{2}$ " screws. ■



Attach the back to the case with glue and finish nails. If needed, you can use a clamp to square the case to the back panel.

*Wall-Mounted Cubby Cabinet Cut List

	Part	Thickness	Width	Length	Qty.	Mat'l
A	Top and Bottom	$\frac{3}{4}$ "	$11\frac{3}{4}$ "	$35\frac{3}{4}$ "	2	HP
B	Sides	$\frac{3}{4}$ "	$11\frac{3}{4}$ "	13"	2	HP
C	Back	$\frac{1}{2}$ "	$12\frac{1}{2}$ "	$35\frac{3}{4}$ "	1	HP
D	Dividers	$\frac{1}{8}$ "	$11\frac{1}{4}$ "	12"	*	H

Materials: HP=Hardwood Plywood, H=Tempered Hardboard

*Make as many dividers as needed to suit your storage needs.

Hardware/Supplies: (16) #8 x $1\frac{1}{4}$ " pocket screws, 1" finish nails, (4) #8 x $2\frac{1}{2}$ " flathead screws

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☐ 1.	Birch Edge Banding, White, $\frac{7}{8}$ " x 25'	#147423	\$8.99
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☐ 3.	Veneer Edge Banding Iron	#144952	\$39.99
☐ 4.	$\frac{3}{8}$ " OD x $\frac{9}{32}$ " ID Bushing	#144689	\$8.09
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An accomplished woodworker from Lubeck, West Virginia, Bill Sands is a regular contributor to *Woodcraft Magazine*, having built several projects. In addition, he teaches woodworking classes at the Parkersburg Woodcraft store.



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The Essential Block Plane

How to choose and use woodworking's most popular trimmer

By Craig Bentzley

It's no secret that I love hand planes and own way too many of them—about 250 at last count. Many of them perform highly specialized tasks and don't see use very often. But there's one type of plane that's a stand-out exception: the block plane. In fact, when I'm asked by beginning woodworkers what plane they should start out with, that's the one that always tops the list.

The ubiquitous block plane is probably owned by more people than any other hand

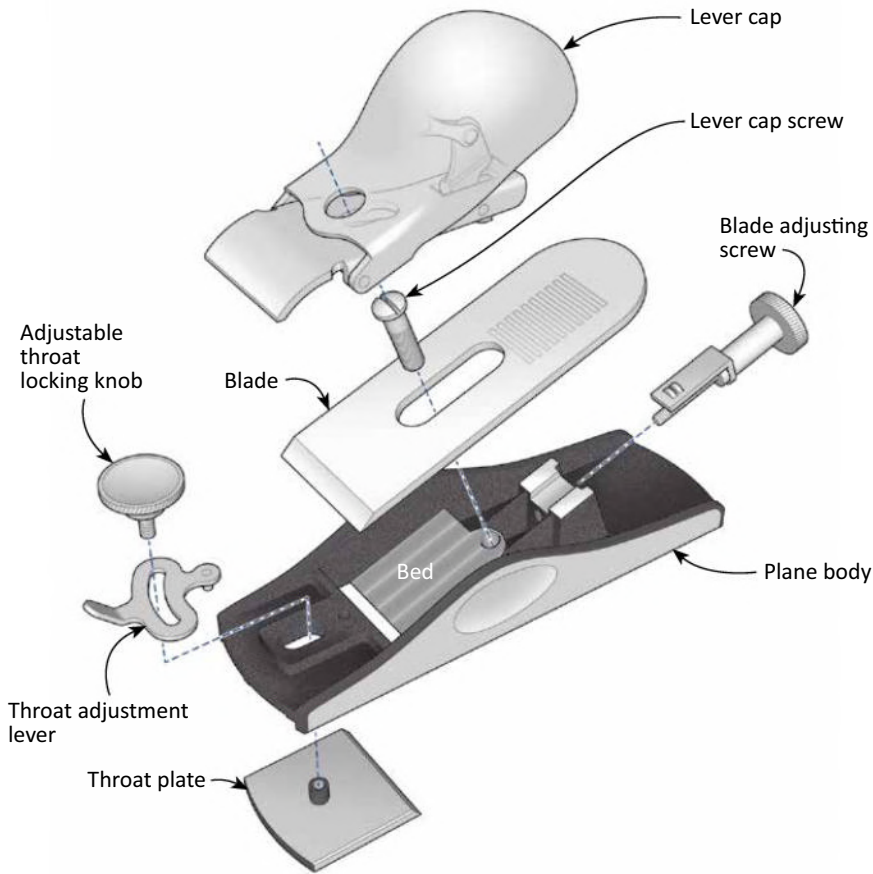
plane. Available in a variety of configurations (as shown above), it's small, relatively inexpensive, and even kind of cute. But it's definitely not a toy. Properly set up and tuned, a good quality block plane is adept at handling all sorts of shop chores and is likely to become one of your most used hand tools. I'll discuss what to look for in a good block plane, how to set one up, and how to use it to your best advantage. Once you make friends with a block plane, you'll wonder how you did without one.

What to look for in a block plane

As shown in **Figure 1** and **Photo A**, a block plane is a fairly basic tool. That said, for good performance, avoid cheap, rudimentary hardware store versions. The most important features to look for in a good block plane include a flat sole, a reliable and easy-to-use depth-of-cut adjustment, and an adjustable throat. You'll also want the tool to feel comfortable in your hand.

Unlike most bench planes, the block plane blade is installed

Figure 1: Anatomy of a block plane



bevel up. In addition to supporting the blade at the cutting edge, this orientation makes it easy to adjust the cutting angle to match the job.

As shown in **Figure 2a**, a standard block plane has a bedding angle of 20°. Adding the standard blade angle of 25° gives you a cutting angle of 45°, which is comparable to standard bench planes. While this angle is fine for planing long grain on most woods, it's not very good for end grain or gnarly woods.

Some manufacturers offer a low-angle block plane with a bedding angle of 12°, as shown in **Figure 2b**. Coupling this with a standard blade angle of 25° yields a cutting angle of 37°, which is better suited for cleanly slicing end grain. On the downside, this lower cutting angle may produce tear-out on

some harder woods, especially in areas of grain reversal.

Forced to choose between a standard or a low-angle block plane, I'd take the latter because it offers more working options. In addition to superior end-grain-cutting ability with

Figure 2: Block Plane Angles

Key:

Cutting angle

Blade angle

Bedding angle

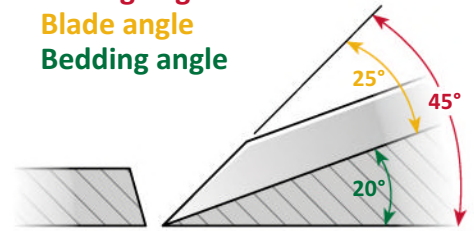


Figure 2a: Standard Block Plane with 25° blade.
Good for cutting with the grain on most woods.

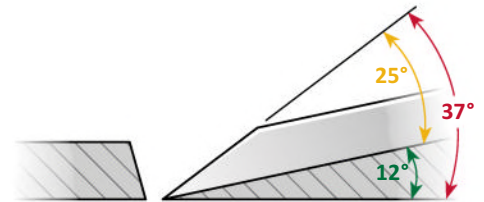


Figure 2b: Low Angle Block Plane with 25° blade.
Good for cutting end grain.

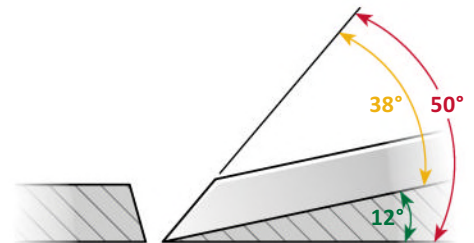


Figure 2c: Low Angle Block Plane with 38° blade.
Good for planing difficult stock.



For a block plane to work well, its parts must be machined accurately so they fit together well and the mechanisms work smoothly.



The low-angle block plane at left is much better for cutting end grain than its standard-angle companion.

a 25° blade angle, a low-angle plane can be outfitted with replacement blades ground to suit other work. For example, grind a replacement blade to 33°, and you have duplicated the 45° cutting angle of a standard-angle block plane for planing with the grain on most woods. Taking it a step further, a blade ground to 38° yields a 50° cutting angle, as shown in **Figure 2c**. This “York pitch” is great for working highly figured wood. For the nastiest stock, grind a blade at 50° to create a cutting angle of 62°, which virtually eliminates tear-out (although the plane will be much harder to push).

Of course, you can also outfit a standard block plane with a modified blade angle. For example, putting a blade with

a 38° angle on a standard block plane produces a cutting angle of 58°, eliminating tear-out. Mix and match. You get the idea.

Cleaning, tuning, and setting

Whether new or used, a block plane will likely need some cleaning and tune-up. Disassemble the plane, and clean all the parts with mineral spirits, scrubbing them if necessary with a brass brush or steel wool. If a straightedge indicates the sole isn’t flat, make it so by rubbing it on successively finer grits of carborundum paper adhered to plate glass or your jointer table with the blade installed and fully retracted. Use a fine file to remove any metal

Get Sharp

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burrs, especially around the throat opening and body edges. Lubricate all mechanisms with a light oil, sharpen the blade, and reassemble the plane.

Set up to cut by first adjusting the blade laterally to project evenly across its width. To do this, tension the lever cap for a slightly snug fit by adjusting the lever cap screw. Then project the blade just enough to see its entire edge when sighting down the sole, and adjust it as shown in **Photo C**. As a rough gauge, I check the projection at each end of the blade with my thumb as I tap. Re-sight and repeat if necessary. (Some block planes include a lateral adjustment mechanism, but I don’t consider them essential.)

Next, turn the blade-adjusting screw to set the depth of cut



To laterally adjust the blade, use a small brass or wood hammer to tap it sideways until it projects evenly from the plane throat.



To adjust the mouth, loosen the throat locking knob, and then rotate the throat adjustment lever to open or close the mouth.

Tip Alert

Swiping paraffin across the sole of any plane will make it glide much more smoothly on a workpiece.

for the job at hand. For fine cuts, this may be only be a few thousandths of an inch. If your plane sports an adjustable throat, open it just enough to prevent clogging (**Photo D**). A wide gap is OK for heavy stock removal, but a tight throat is preferable because it keeps the wood fibers from lifting ahead of the blade and tearing out.

Always retract, and then advance, the blade to “sneak up” on the depth of cut. Don’t set the projection while retracting the blade, or else backlash in the adjustment mechanism will allow the blade to slide backward in use. Once your adjustments yield the desired depth of cut and a full-width shaving of uniform thickness, snug down the lever cap. It should be tight enough to stay in place while allowing further blade adjustments during the course of your work.

Using a block plane

A block plane is my go-to tool for all sorts of chores. For example,

it’s much faster and cleaner than sanding when it comes to removing saw marks from end grain (**Photo E**). To avoid splitting away the fibers at the end of the cut, plane inward toward the center from each end.

Another very common block plane operation is flush-trimming solid wood edging on plywood panels (**Photo F**). Along the same lines, it’s great for leveling protruding dovetail pins and box joint fingers (**Photo G**).

The list goes on: the plane will clean up mill marks and break and bevel edges, including back-beveling the non-hinged edge of a door for swing clearance. Other uses include adjusting door and drawer front gaps, chamfering the edges of table tops, and shaping and smoothing convex surfaces. You can even set it up as a miniature shooting board plane for trimming the ends of small parts.

Although the natural inclination is to use a block plane one-handed, most precision operations demand two-handed control. Applying firm downward pressure at the front of the plane with one hand while powering the tool forward with your other hand provides better command over the tool. ■



When planing end grain, it’s important that your blade is razor-sharp and set for a very fine cut. Skewing the plane a bit makes the job easier.



To plane solid wood edging, begin with a coarse cut for quick stock removal, then readjust the blade for a fine cut that won’t mar the plywood veneer.



About Our Author

Craig Bentzley has been restoring antiques and building furniture for nearly 40 years. In addition to writing, Craig also teaches at guilds, woodworking shows, and at Woodcraft stores.



When leveling box joint fingers (or dovetail protrusions), plane inward toward the center of the workpiece to prevent splitting the material.

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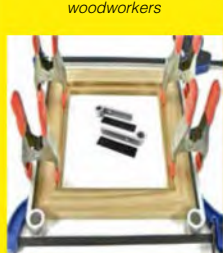
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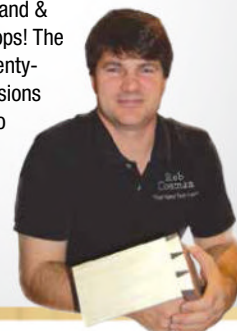
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